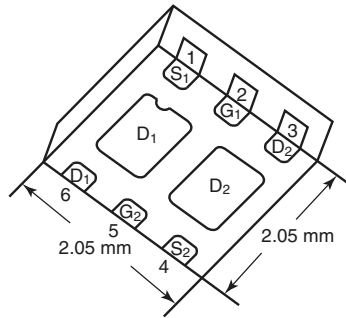
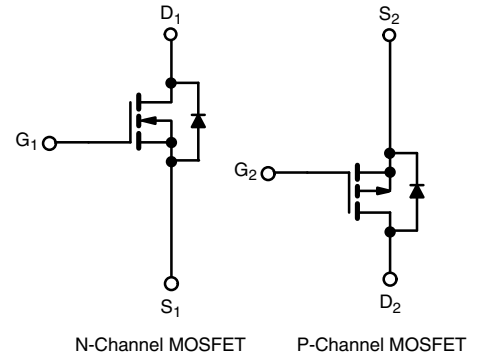


N- and P-Channel 20-V (D-S) MOSFET

PRODUCT SUMMARY				
	V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)	Q _g (Typ.)
N-Channel	20	0.040 at V _{GS} = 4.5 V	4.2	3.7 nC
		0.065 at V _{GS} = 2.5 V	3.3	
P-Channel	- 20	0.090 at V _{GS} = - 4.5 V	- 2.9	5.3 nC
		0.137 at V _{GS} = - 2.5 V	- 2.3	



DFNWB2*2-6L-A



N-Channel MOSFET

P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted)				
Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	V _{DS}	20	- 20	V
Gate-Source Voltage	V _{GS}	± 12		
Continuous Drain Current (T _J = 150 °C)	I _D	4.2	- 2.9	A
Pulsed Drain Current	I _{DM}	15	- 15	
Source Drain Current Diode Current	I _S	4.5	- 4.5	W
Maximum Power Dissipation	P _D	7.8	7.8	
		T _A = 25 °C	1.9	1.9
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150		°C
Soldering Recommendations (Peak Temperature) ^{d, e}		260		

THERMAL RESISTANCE RATINGS						
Parameter	Symbol	N-Channel		P-Channel		Unit
		Typ.	Max.	Typ.	Max.	
Maximum Junction-to-Ambient ^{b, f}	R _{thJA}	52	65	52	65	°C/W
Maximum Junction-to-Case (Drain)	R _{thJC}	12.5	16	12.5	16	



SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)						
Parameter	Symbol	Test Conditions		Min.	Typ.	Max. Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	N-Ch	20		V
		$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	P-Ch	-20		
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$	N-Ch		23	mV/ $^\circ\text{C}$
		$I_D = -250\text{ }\mu\text{A}$	P-Ch		-11	
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	$I_D = 250\text{ }\mu\text{A}$	N-Ch		-3.3	
		$I_D = -250\text{ }\mu\text{A}$	P-Ch		2.6	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	N-Ch	0.6		1.4
		$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	P-Ch	-0.5		-1.3
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 12\text{ V}$	N-Ch			± 0.1
			P-Ch			± 0.1
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}$	N-Ch			0.1
		$V_{DS} = -20\text{ V}, V_{GS} = 0\text{ V}$	P-Ch			-0.1
On-State Drain Current ^b	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 4.5\text{ V}$	N-Ch	10		A
		$V_{DS} \leq -5\text{ V}, V_{GS} = -4.5\text{ V}$	P-Ch	-10		
Drain-Source On-State Resistance ^b	$R_{DS(on)}$	$V_{GS} = 4.5\text{ V}, I_D = 4.2\text{ A}$	N-Ch		0.032	0.040
		$V_{GS} = -4.5\text{ V}, I_D = -2.9\text{ A}$	P-Ch		0.074	0.090
		$V_{GS} = 2.5\text{ V}, I_D = 3.3\text{ A}$	N-Ch		0.053	0.065
		$V_{GS} = -2.5\text{ V}, I_D = -2.3\text{ A}$	P-Ch		0.113	0.137
Forward Transconductance ^b	g_{fs}	$V_{DS} = 10\text{ V}, I_D = 4.2\text{ A}$	N-Ch		12	S
		$V_{DS} = -10\text{ V}, I_D = -2.9\text{ A}$	P-Ch		7	
Dynamic^a						
Input Capacitance	C_{iss}	N-Channel $V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	N-Ch		350	pF
Output Capacitance	C_{oss}		P-Ch		340	
Reverse Transfer Capacitance	C_{rss}	P-Channel $V_{DS} = -10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	N-Ch		82	
			P-Ch		105	
Total Gate Charge	Q_g	$V_{DS} = 10\text{ V}, V_{GS} = 10\text{ V}, I_D = 5.5\text{ A}$	N-Ch		7.7	12
		$V_{DS} = -10\text{ V}, V_{GS} = -10\text{ V}, I_D = -3.7\text{ A}$	P-Ch		10.5	16
	Q_{gs}	N-Channel $V_{DS} = 10\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 5.5\text{ A}$	N-Ch		3.7	6
			P-Ch		5.3	8
Gate-Drain Charge	Q_{gd}	P-Channel $V_{DS} = -10\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -3.7\text{ A}$	N-Ch		0.85	
			P-Ch		0.75	
Gate Resistance	R_g	$f = 1\text{ MHz}$	N-Ch	0.7	3.5	7
			P-Ch	0.2	10	20

Notes:

a. Guaranteed by design, not subject to production testing.

b. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.



SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)								
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit		
Dynamic^a								
Turn-On Delay Time	$t_{d(on)}$	N-Channel $V_{DD} = 10\text{ V}$, $R_L = 2.3\ \Omega$ $I_D \cong 4.4\text{ A}$, $V_{GEN} = 4.5\text{ V}$, $R_g = 1\ \Omega$	N-Ch		10	15	ns	
			P-Ch		20	30		
Rise Time	t_r		N-Ch		12	20		
			P-Ch		20	30		
Turn-Off Delay Time	$t_{d(off)}$	P-Channel $V_{DD} = -10\text{ V}$, $R_L = 3.3\ \Omega$ $I_D \cong -3\text{ A}$, $V_{GEN} = -4.5\text{ V}$, $R_g = 1\ \Omega$	N-Ch		21	35		
			P-Ch		25	40		
Fall Time	t_f		N-Ch		16	25		
			P-Ch		10	15		
Turn-On Delay Time	$t_{d(on)}$	N-Channel $V_{DD} = 10\text{ V}$, $R_L = 2.3\ \Omega$ $I_D \cong 4.4\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_g = 1\ \Omega$	N-Ch		5	10		
			P-Ch		5	10		
Rise Time	t_r		N-Ch		10	15		
			P-Ch		10	15		
Turn-Off Delay Time	$t_{d(off)}$	P-Channel $V_{DD} = -10\text{ V}$, $R_L = 3.3\ \Omega$ $I_D \cong -3\text{ A}$, $V_{GEN} = -10\text{ V}$, $R_g = 1\ \Omega$	N-Ch		15	25		
			P-Ch		20	30		
Fall Time	t_f		N-Ch		10	15		
			P-Ch		10	15		
Drain-Source Body Diode Characteristics								
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$	N-Ch			4.5	A	
			P-Ch			-4.5		
Pulse Diode Forward Current ^a	I_{SM}		N-Ch			15		
			P-Ch			-15		
Body Diode Voltage	V_{SD}	$I_S = 4.4\text{ A}$, $V_{GS} = 0\text{ V}$	N-Ch		0.8	1.2	V	
		$I_S = -3\text{ A}$, $V_{GS} = 0\text{ V}$	P-Ch		-0.8	-1.2		
Body Diode Reverse Recovery Time	t_{rr}	N-Channel $I_F = 4.4\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$, $T_J = 25\text{ }^\circ\text{C}$ P-Channel $I_F = -3\text{ A}$, $di/dt = -100\text{ A}/\mu\text{s}$, $T_J = 25\text{ }^\circ\text{C}$	N-Ch		15	30	ns	
			P-Ch		26	50		
Body Diode Reverse Recovery Charge	Q_{rr}			N-Ch		8	20	nC
				P-Ch		13	25	
Reverse Recovery Fall Time	t_a		N-Ch		8		ns	
			P-Ch		14			
Reverse Recovery Rise Time	t_b		N-Ch		7			
			P-Ch		12			

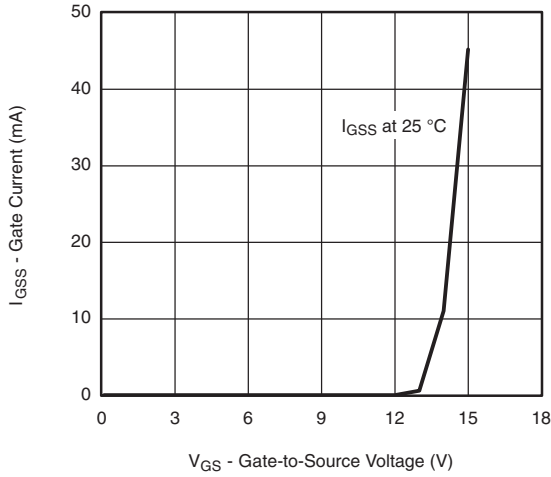
Notes:

a. Guaranteed by design, not subject to production testing.

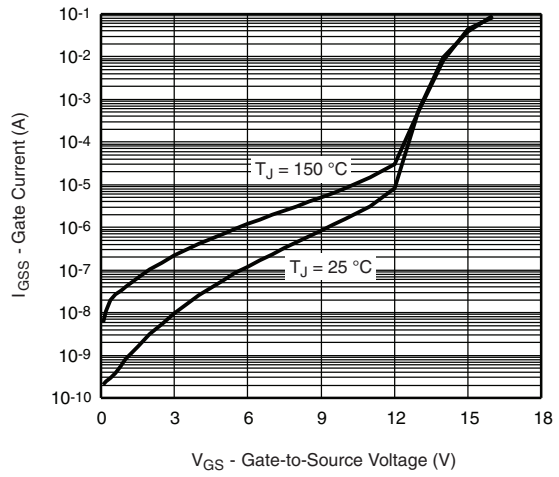
b. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.



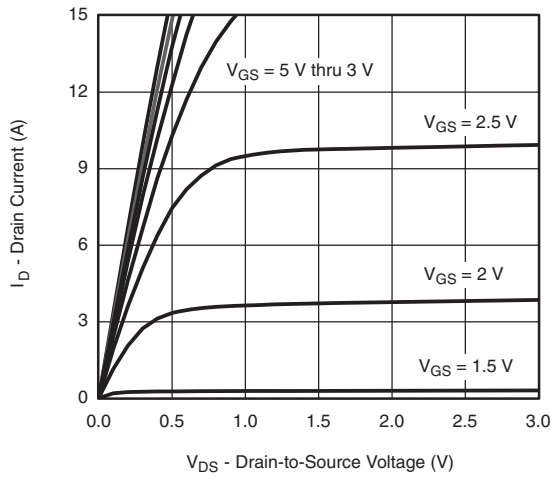
N-CHANNEL TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



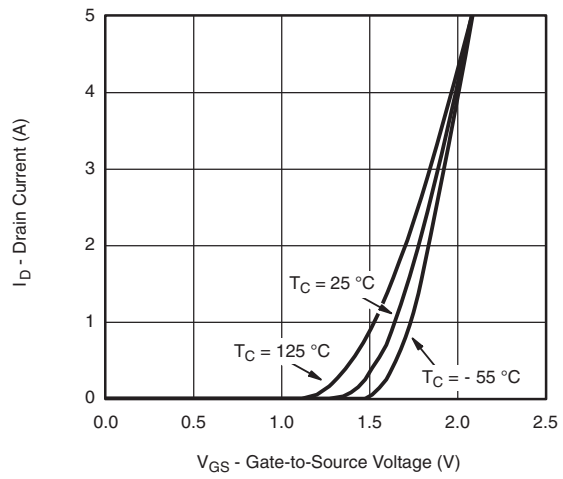
Gate Current vs. Gate-Source Voltage



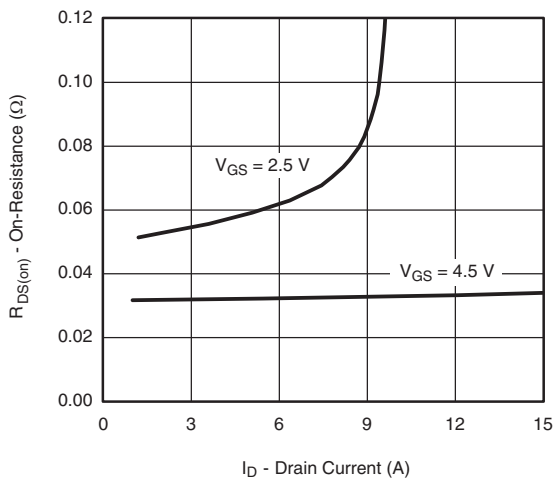
Gate Current vs. Gate-Source Voltage



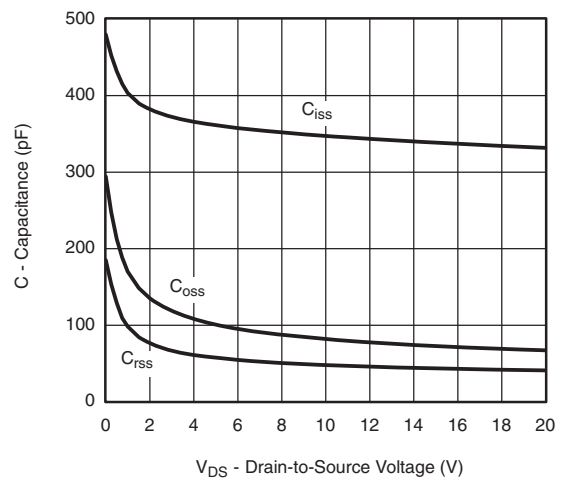
Output Characteristics



Transfer Characteristics

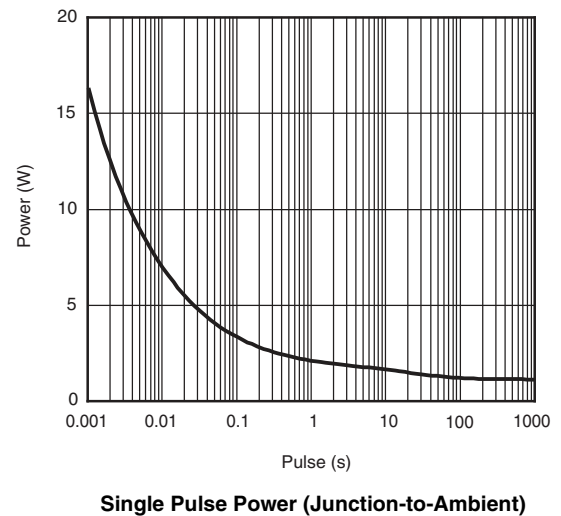
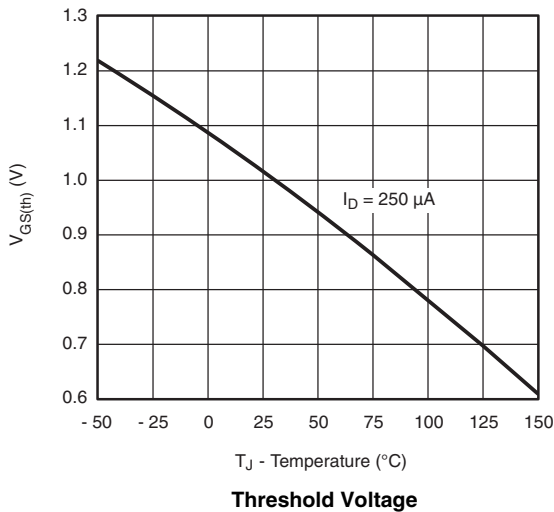
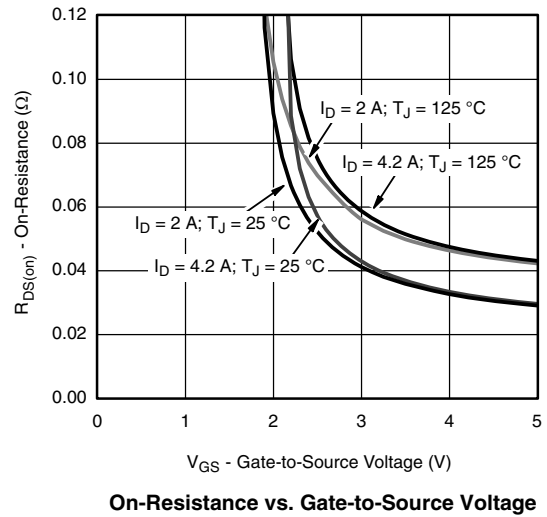
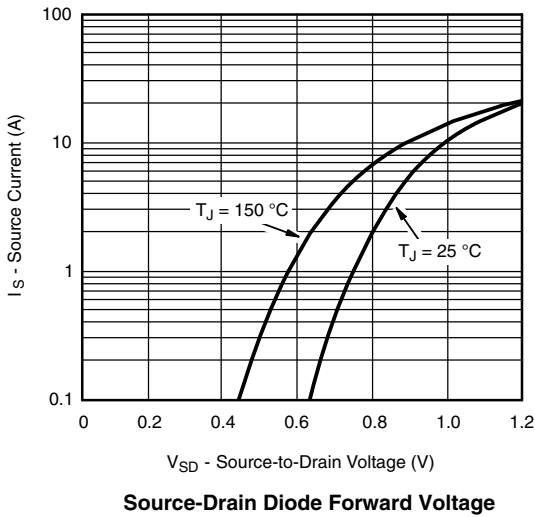
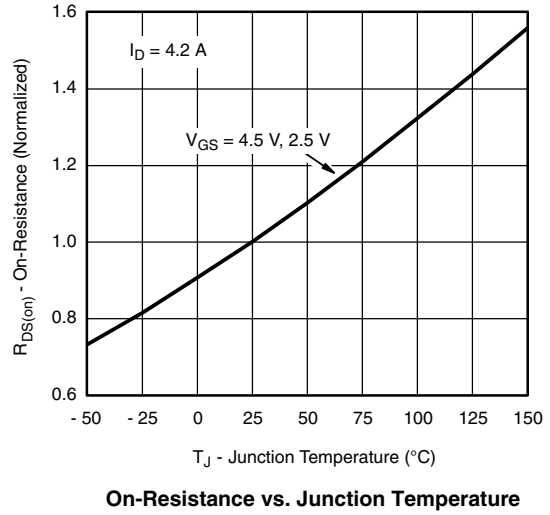
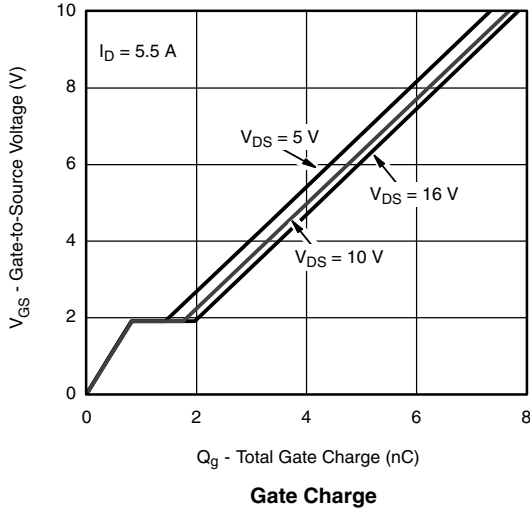


On-Resistance vs. Drain Current and Gate Voltage

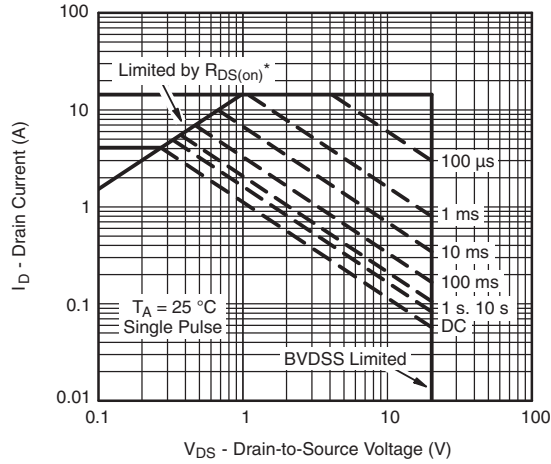


Capacitance

N-CHANNEL TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

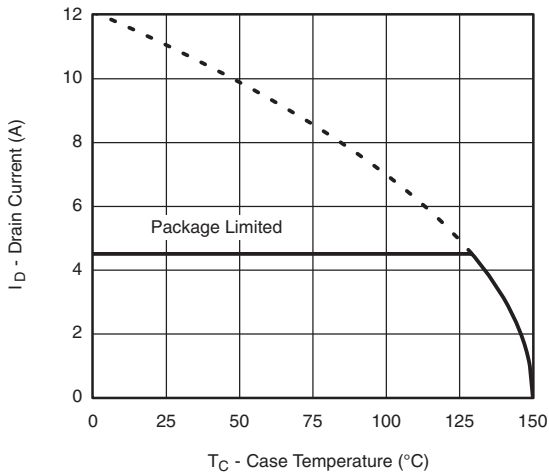


N-CHANNEL TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

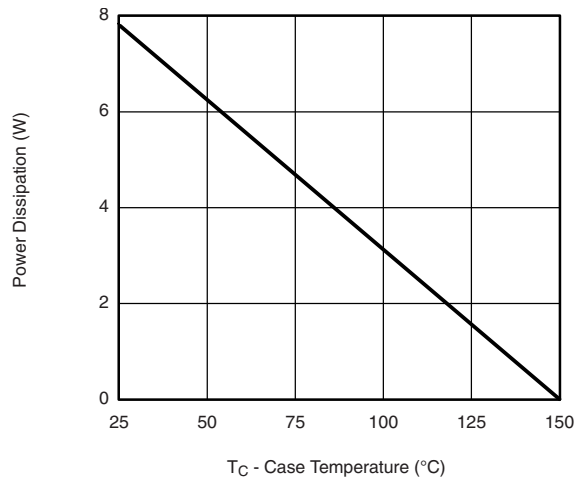


* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient



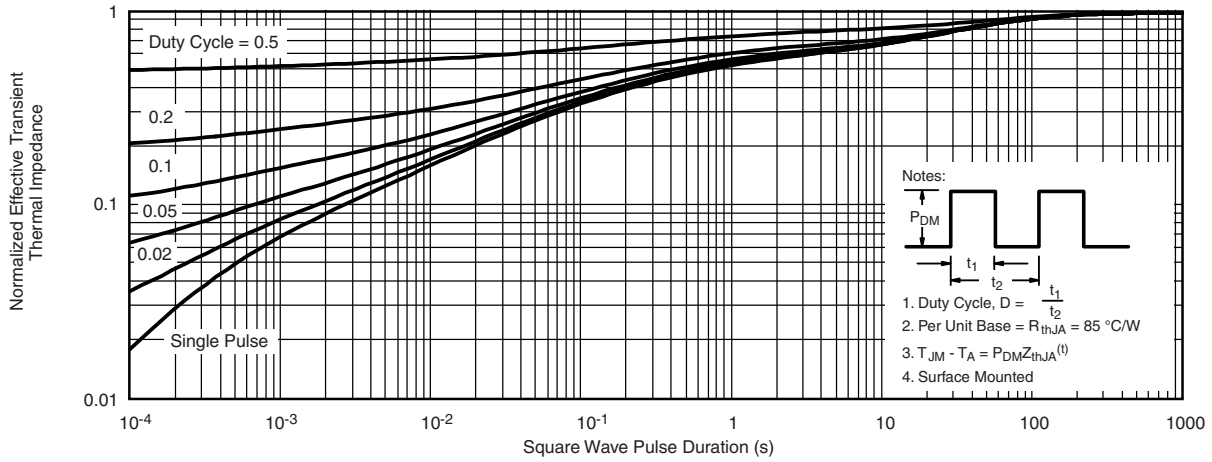
Current Derating*



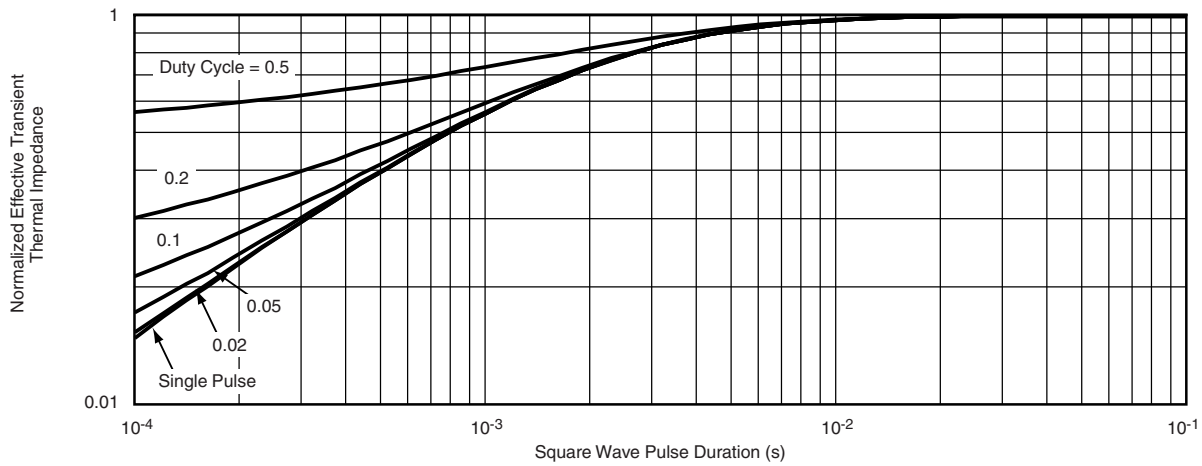
Power Derating

* The power dissipation P_D is based on $T_{J(max.)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

N-CHANNEL TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

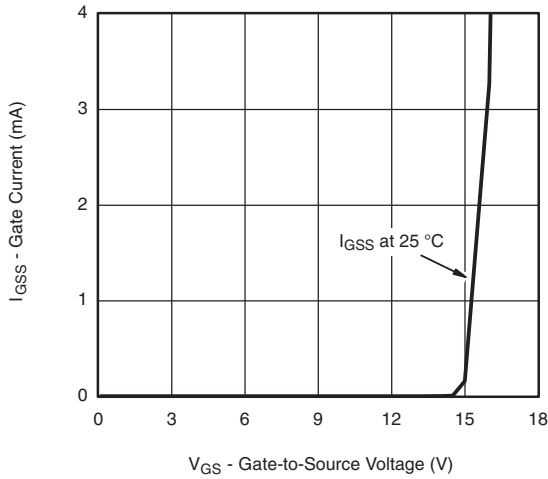


Normalized Thermal Transient Impedance, Junction-to-Ambient

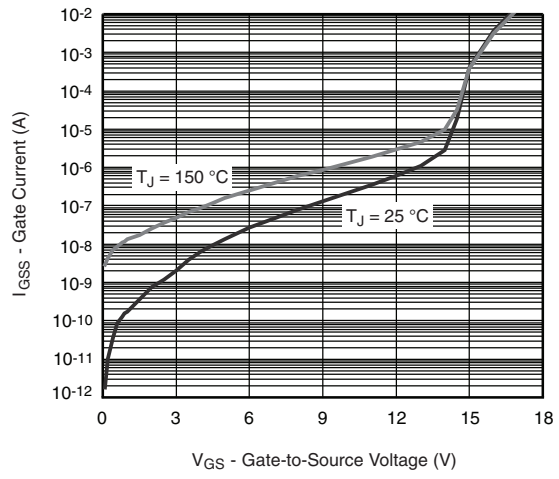


Normalized Thermal Transient Impedance, Junction-to-Case

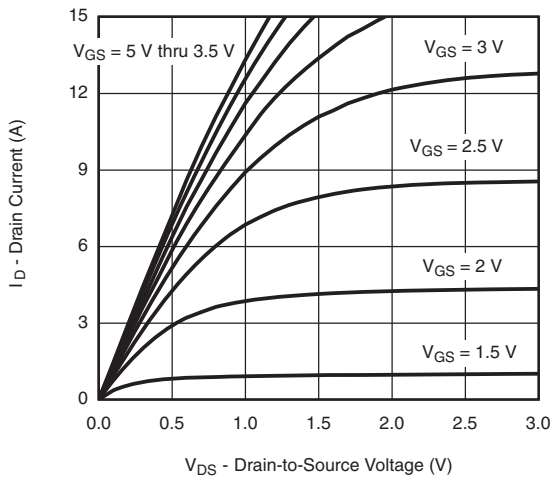
P-CHANNEL TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



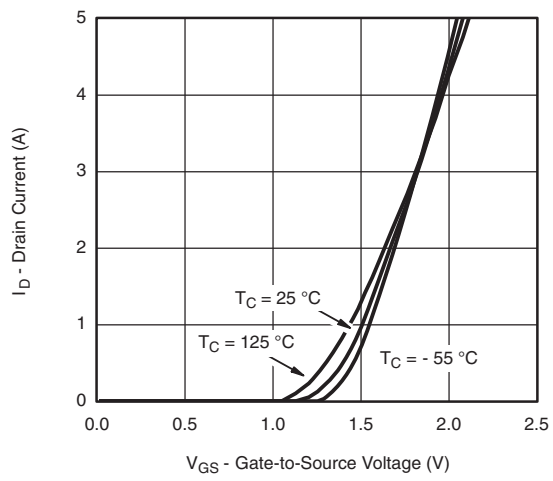
Gate Current vs. Gate-Source Voltage



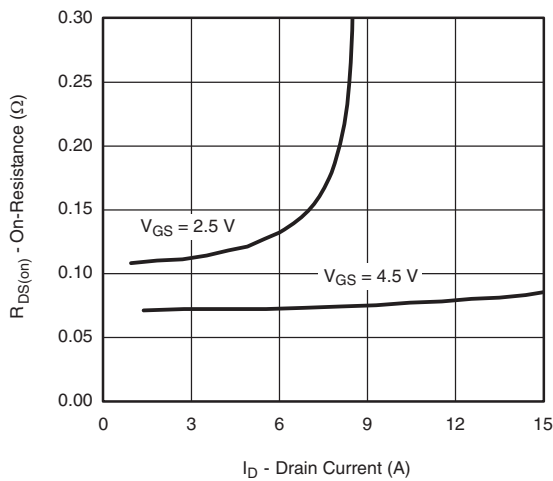
Gate Current vs. Gate-Source Voltage



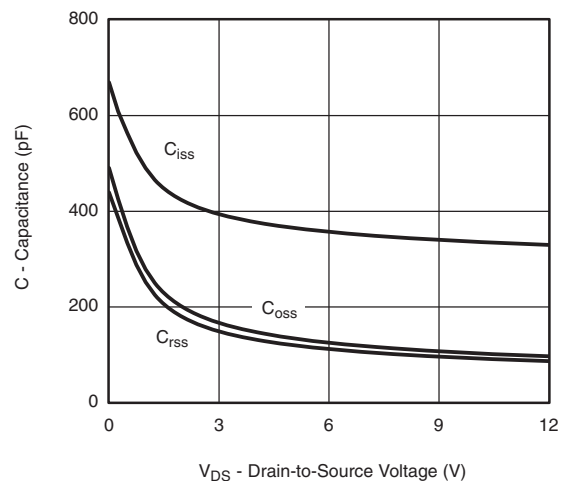
Output Characteristics



Transfer Characteristics

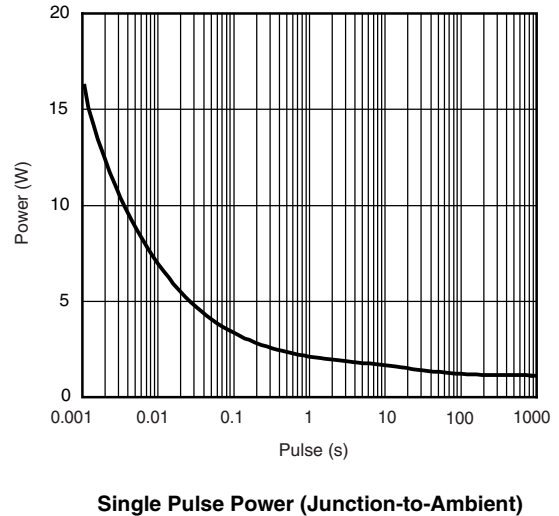
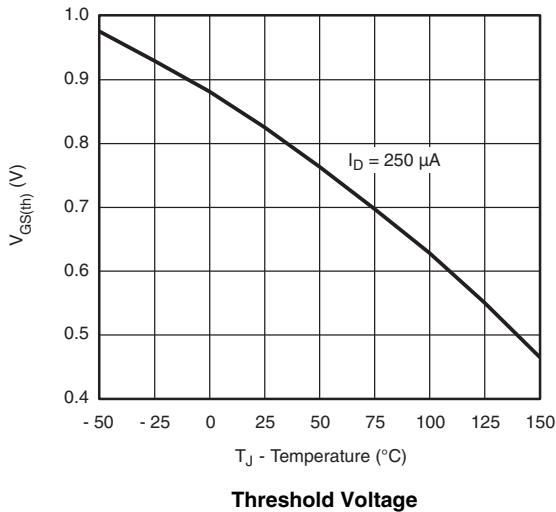
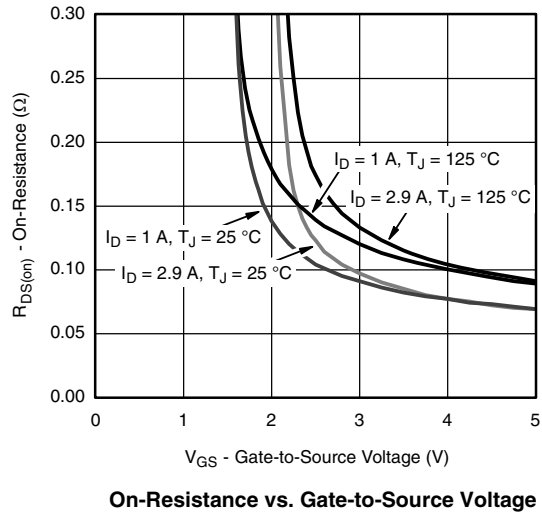
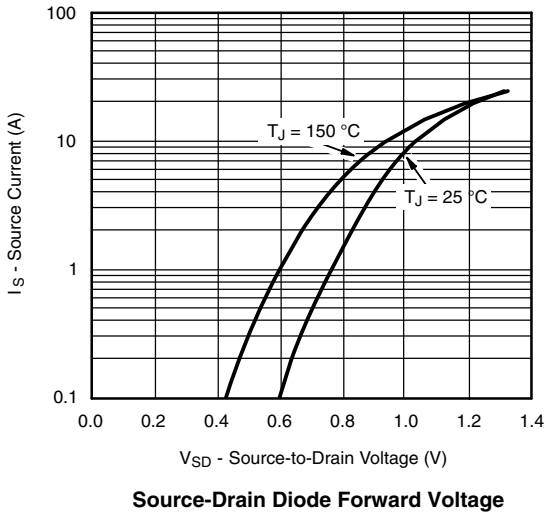
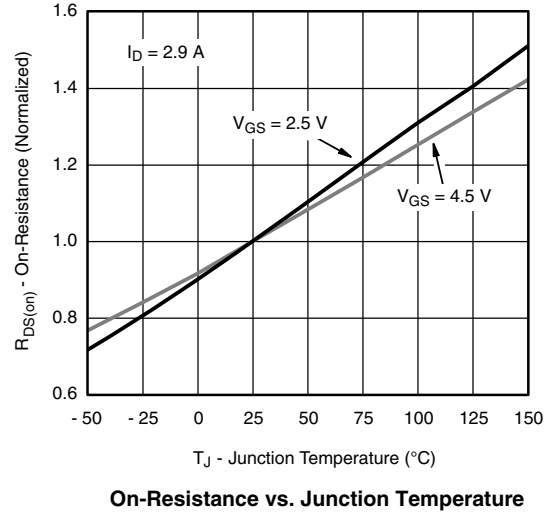
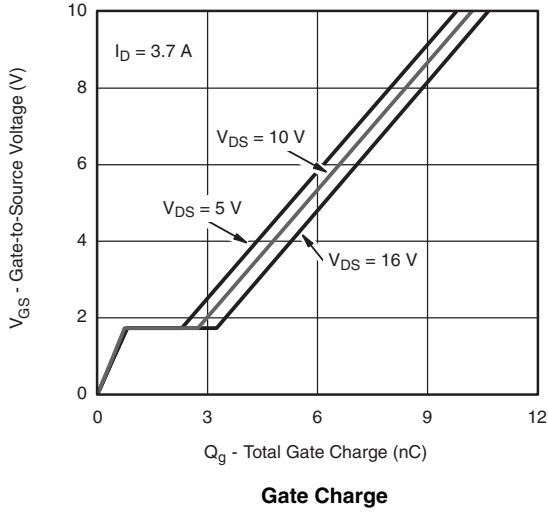


On-Resistance vs. Drain Current and Gate Voltage

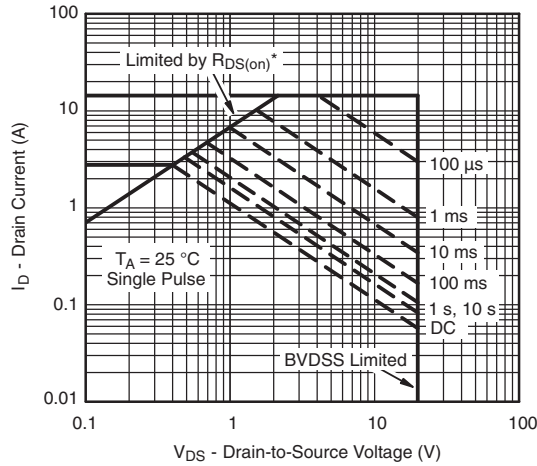


Capacitance

P-CHANNEL TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

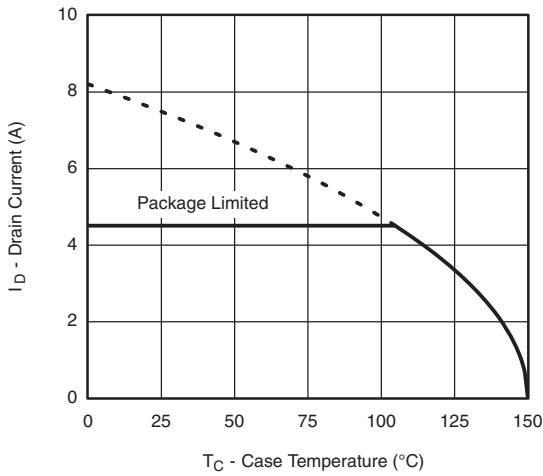


P-CHANNEL TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

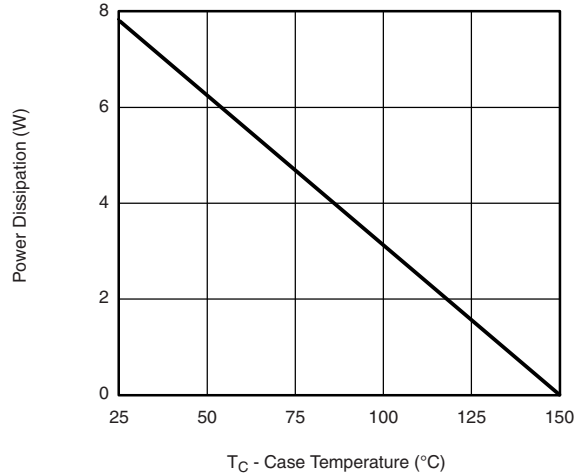


* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient



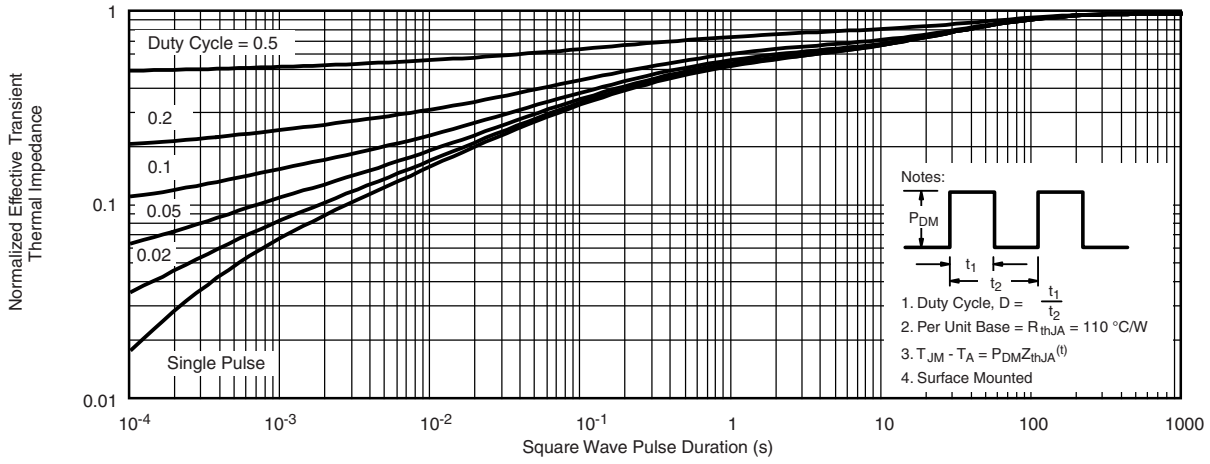
Current Derating*



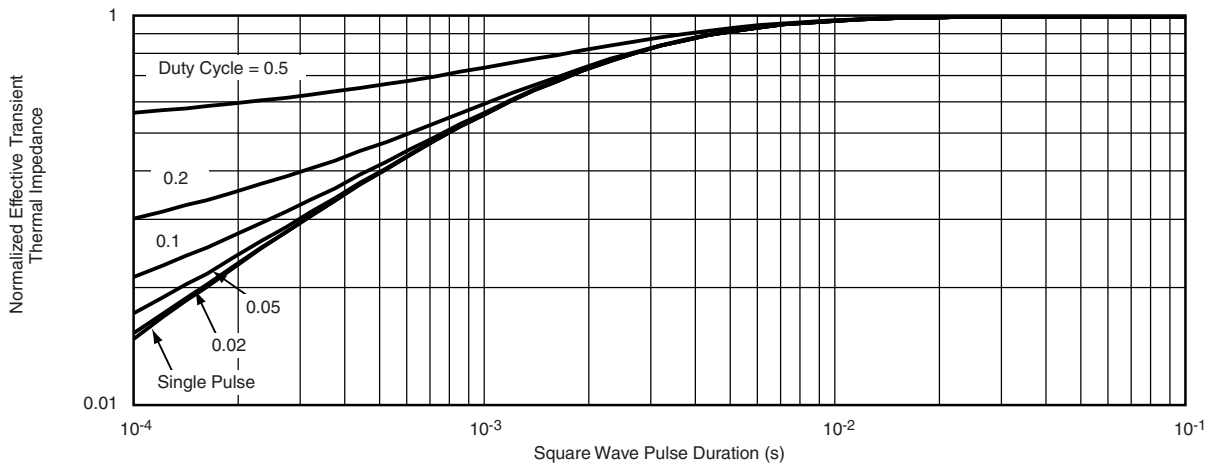
Power Derating

* The power dissipation P_D is based on $T_{J(max.)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

P-CHANNEL TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

PowerPAK® SC70-6L



BACKSIDE VIEW OF SINGLE



BACKSIDE VIEW OF DUAL



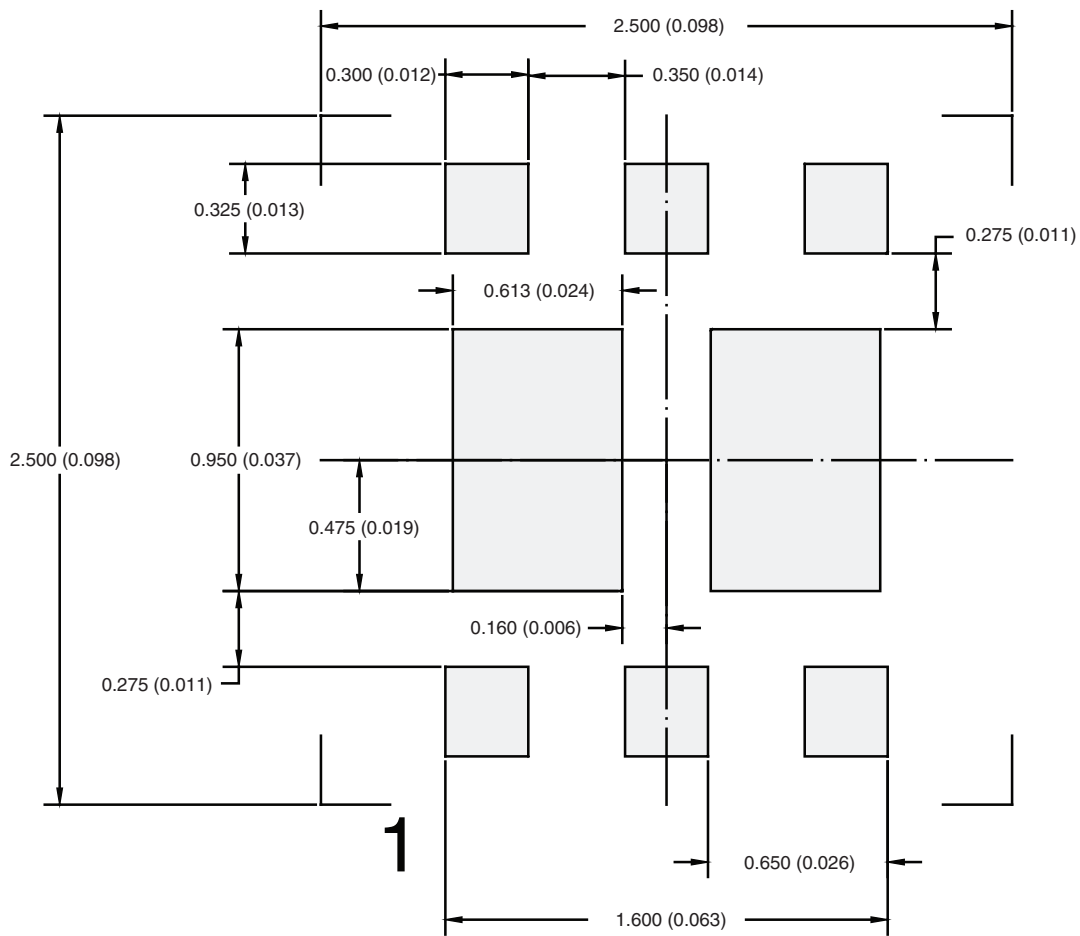
Notes:

1. All dimensions are in millimeters
2. Package outline exclusive of mold flash and metal burr
3. Package outline inclusive of plating

DIM	SINGLE PAD						DUAL PAD					
	MILLIMETERS			INCHES			MILLIMETERS			INCHES		
	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max	Min	Nom	Max
A	0.675	0.75	0.80	0.027	0.030	0.032	0.675	0.75	0.80	0.027	0.030	0.032
A1	0	-	0.05	0	-	0.002	0	-	0.05	0	-	0.002
b	0.23	0.30	0.38	0.009	0.012	0.015	0.23	0.30	0.38	0.009	0.012	0.015
C	0.15	0.20	0.25	0.006	0.008	0.010	0.15	0.20	0.25	0.006	0.008	0.010
D	1.98	2.05	2.15	0.078	0.081	0.085	1.98	2.05	2.15	0.078	0.081	0.085
D1	0.85	0.95	1.05	0.033	0.037	0.041	0.513	0.613	0.713	0.020	0.024	0.028
D2	0.135	0.235	0.335	0.005	0.009	0.013						
E	1.98	2.05	2.15	0.078	0.081	0.085	1.98	2.05	2.15	0.078	0.081	0.085
E1	1.40	1.50	1.60	0.055	0.059	0.063	0.85	0.95	1.05	0.033	0.037	0.041
E2	0.345	0.395	0.445	0.014	0.016	0.018						
E3	0.425	0.475	0.525	0.017	0.019	0.021						
e	0.65 BSC			0.026 BSC			0.65 BSC			0.026 BSC		
K	0.275 TYP			0.011 TYP			0.275 TYP			0.011 TYP		
K1	0.400 TYP			0.016 TYP			0.320 TYP			0.013 TYP		
K2	0.240 TYP			0.009 TYP			0.252 TYP			0.010 TYP		
K3	0.225 TYP			0.009 TYP								
K4	0.355 TYP			0.014 TYP								
L	0.175	0.275	0.375	0.007	0.011	0.015	0.175	0.275	0.375	0.007	0.011	0.015
T							0.05	0.10	0.15	0.002	0.004	0.006

ECN: C-07431 – Rev. C, 06-Aug-07
DWG: 5934

RECOMMENDED PAD LAYOUT FOR PowerPAK® SC70-6L Dual



Dimensions in mm (inches)

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