Asymmetric Dual N-Channel 30-V (D-S) MOSFET

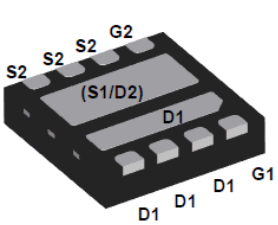
Key Features:
- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed

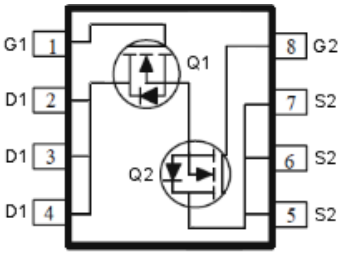
Typical Applications:
- DC/DC Conversion

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (mΩ)	I_D (A)
Q1 20	28 @ V_{GS} = 5V	7.7
Q2 30	16 @ V_{GS} = 5V	10.2

Pb-free
RoHS COMPLIANT
HALOGEN FREE

DFN3X3-8L





ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)					
Parameter		**Symbol**	**Q1 Limit**	**Q2 Limit**	**Units**
Drain-Source Voltage		V_{DS}	20	30	V
Gate-Source Voltage		V_{GS}	±8	±20	
Continuous Drain Current [a]	T_A=25°C	I_D	7.7	10.2	A
	T_A=70°C		5.6	7.4	
Pulsed Drain Current [b]		I_{DM}	30	40	
Continuous Source Current (Diode Conduction) [a]		I_S	3	3.8	A
Power Dissipation [a]	T_A=25°C	P_D	2.5	2.5	W
	T_A=70°C		1.3	1.3	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150		°C

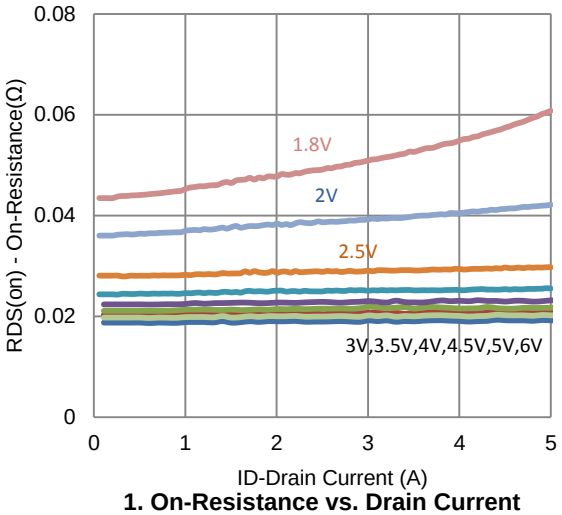
THERMAL RESISTANCE RATINGS				
Parameter		**Symbol**	**Maximum**	**Units**
Maximum Junction-to-Ambient [a]	t <= 10 sec	$R_{\theta JA}$	83	°C/W
	Steady State		120	

Notes
a. Surface Mounted on 1” x 1” FR4 Board.
b. Pulse width limited by maximum junction temperature

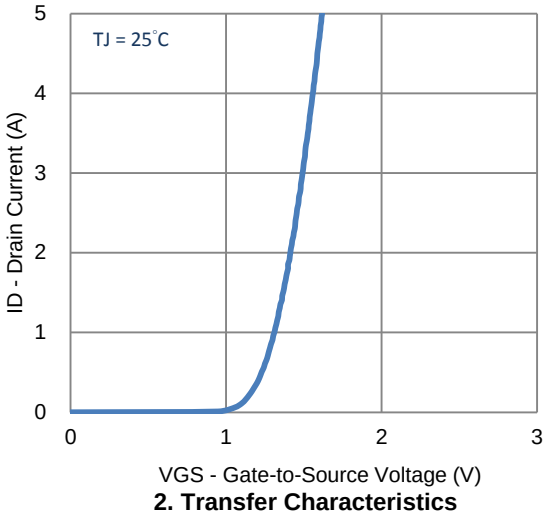
Electrical Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 uA **(Q1)**	0.4			V
		V_{DS} = V_{GS}, I_D = 250 uA **(Q2)**	1			V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±8 V **(Q1)**			±100	nA
		V_{DS} = 0 V, V_{GS} = ±20 V **(Q2)**			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 16 V, V_{GS} = 0 V **(Q1)**			1	uA
		V_{DS} = 24 V, V_{GS} = 0 V **(Q2)**			1	
On-State Drain Current [a]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 4.5 V **(Q1)**	10			A
		V_{DS} = 5 V, V_{GS} = 10 V **(Q2)**	15			A
Drain-Source On-Resistance [a]	$r_{DS(on)}$	V_{GS} = 5 V, I_D = 6.2 A **(Q1)**			28	mΩ
		V_{GS} = 5 V, I_D = 8.2 A **(Q2)**			16	mΩ
Forward Transconductance [a]	g_{fs}	V_{DS} = 15 V, I_D = 6.2 A **(Q1)**		7		S
		V_{DS} = 15 V, I_D = 8.2 A **(Q2)**		13		S
Diode Forward Voltage [a]	V_{SD}	I_S = 1.5 A, V_{GS} = 0 V **(Q1)**		0.74		V
		I_S = 1.9 A, V_{GS} = 0 V **(Q2)**		0.77		V
Dynamic [b]						
Total Gate Charge	Q_g	Q1 V_{DS} = 10 V, V_{GS} = 4.5 V, I_D = 6.2 A		7		nC
Gate-Source Charge	Q_{gs}			1.1		
Gate-Drain Charge	Q_{gd}			2.3		
Turn-On Delay Time	$t_{d(on)}$	Q1 V_{DD} = 10 V, R_L = 2.9 Ω, I_D = 6.2 A, V_{GEN} = 4.5 V, R_{GEN} = 6 Ω		10		ns
Rise Time	t_r			23		
Turn-Off Delay Time	$t_{d(off)}$			36		
Fall Time	t_f			16		
Input Capacitance	C_{iss}	Q1 V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz		439		pF
Output Capacitance	C_{oss}			78		
Reverse Transfer Capacitance	C_{rss}			68		
Total Gate Charge	Q_g	Q2 V_{DS} = 15 V, V_{GS} = 4.5 V, I_D = 8.2 A		11		nC
Gate-Source Charge	Q_{gs}			5.0		
Gate-Drain Charge	Q_{gd}			3.6		
Turn-On Delay Time	$t_{d(on)}$	Q2 V_{DD} = 15 V, R_L = 1.8 Ω, I_D = 8.2 A, V_{GEN} = 10 V, R_{GEN} = 6 Ω		7		ns
Rise Time	t_r			6		
Turn-Off Delay Time	$t_{d(off)}$			30		
Fall Time	t_f			9		
Input Capacitance	C_{iss}	Q2 V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz		1379		pF
Output Capacitance	C_{oss}			156		
Reverse Transfer Capacitance	C_{rss}			116		

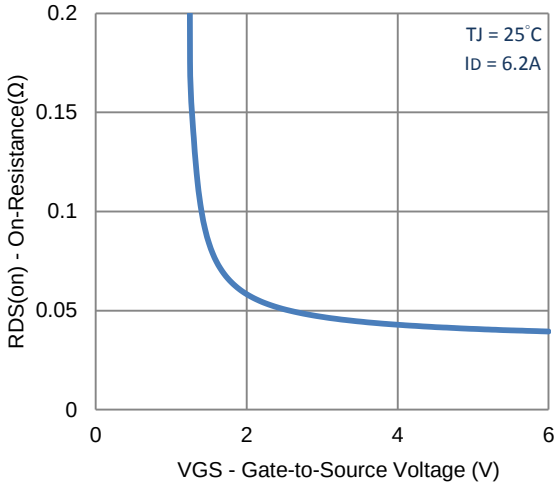
Typical Electrical Characteristics - Q1



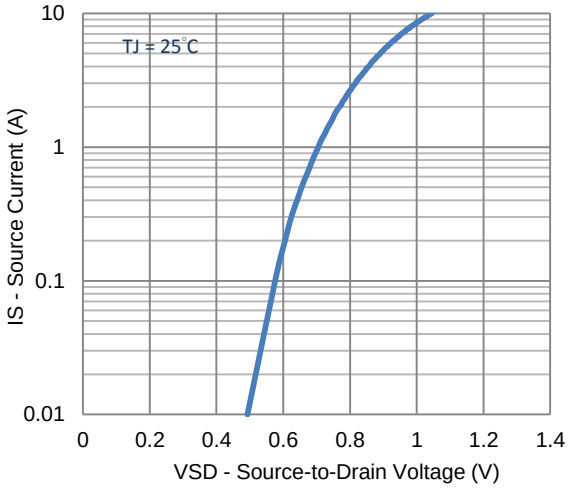
1. On-Resistance vs. Drain Current



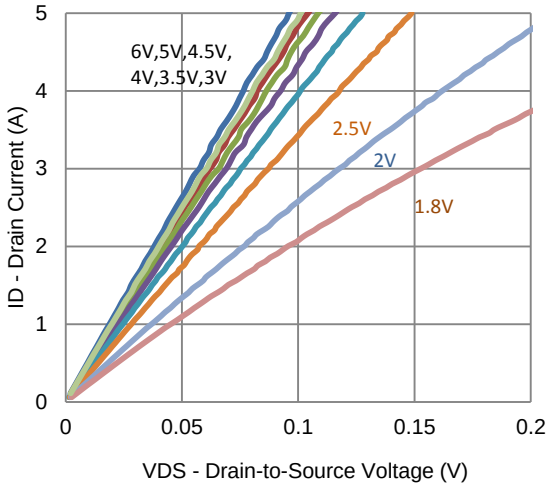
2. Transfer Characteristics



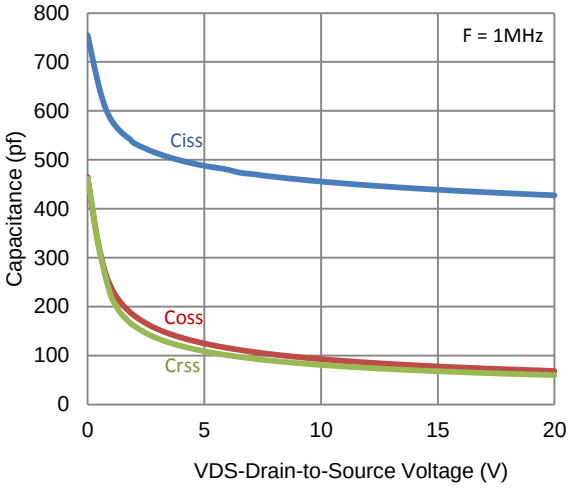
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

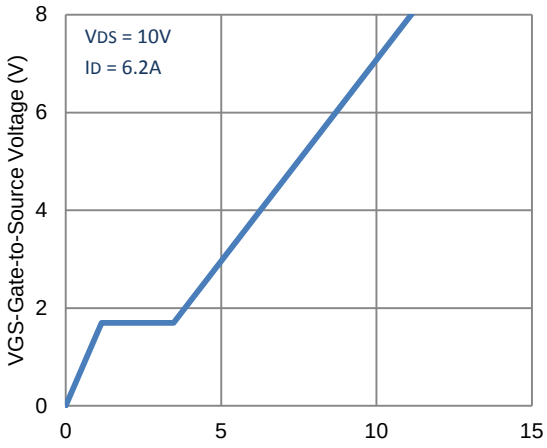


5. Output Characteristics

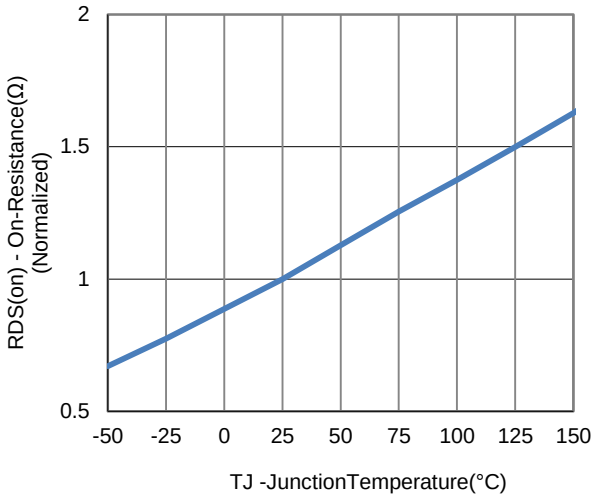


6. Capacitance

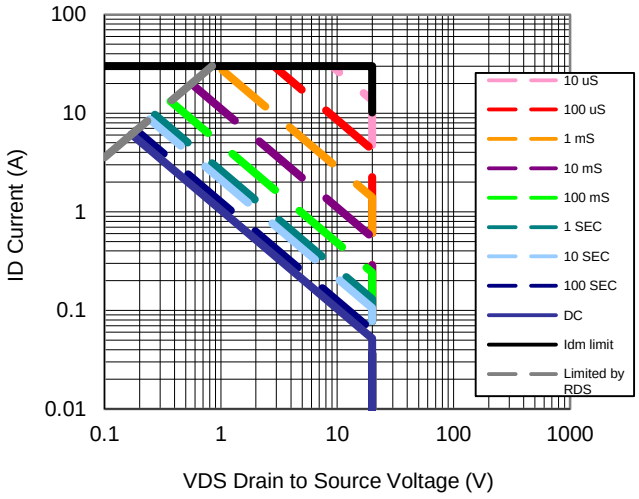
Typical Electrical Characteristics - Q1



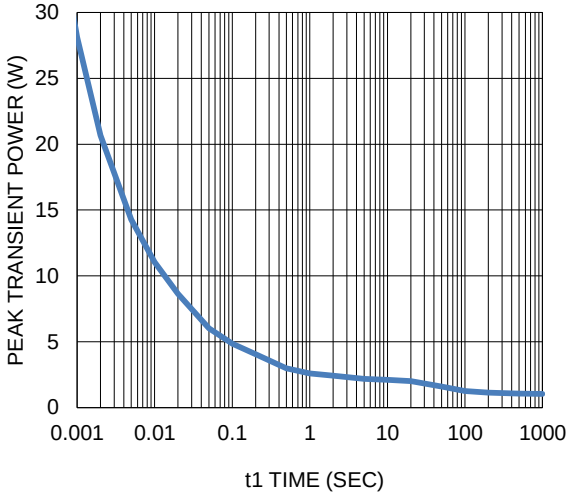
7. Gate Charge



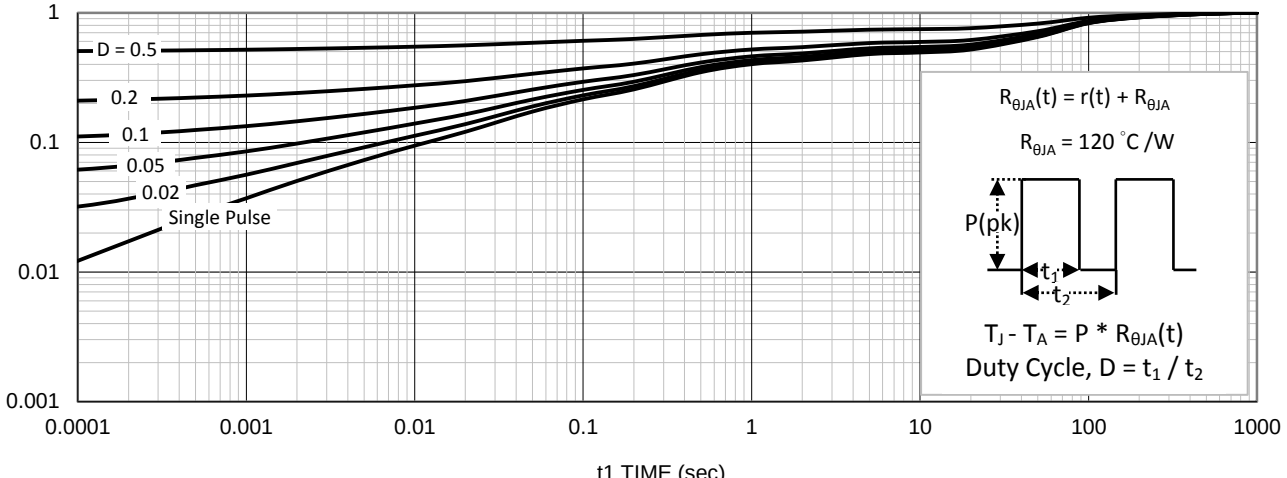
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

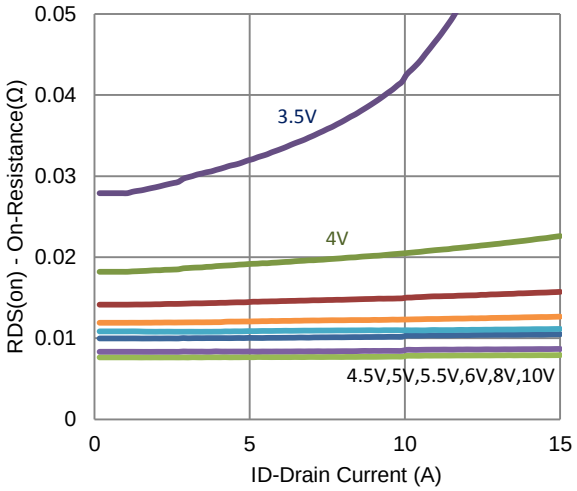


10. Single Pulse Maximum Power Dissipation

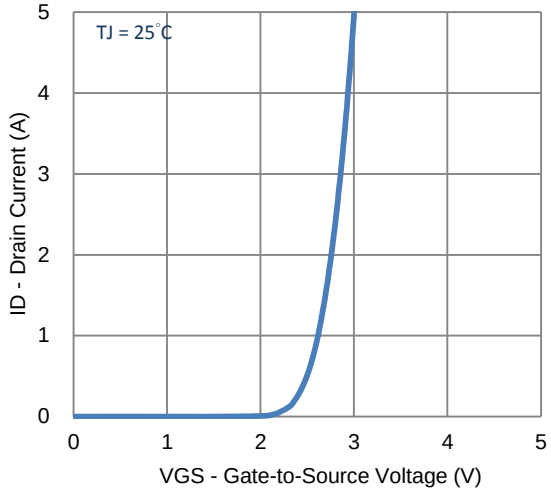


11. Normalized Thermal Transient Junction to Ambient

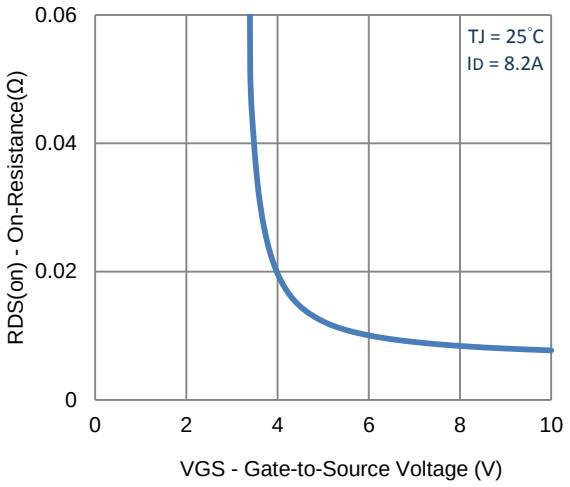
Typical Electrical Characteristics - Q2



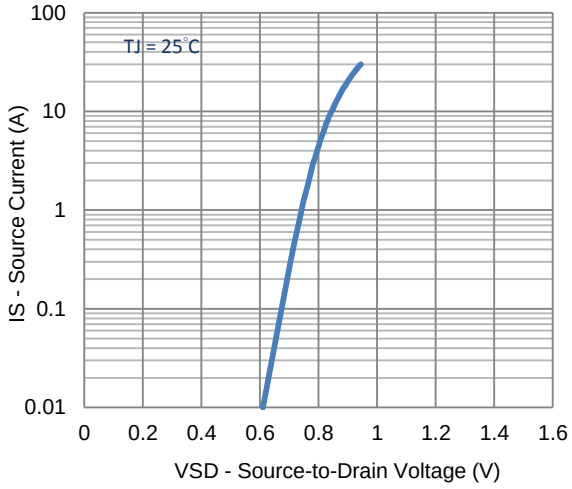
1. On-Resistance vs. Drain Current



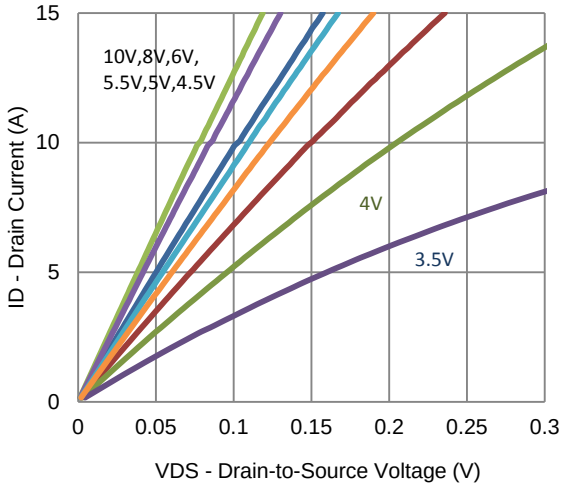
2. Transfer Characteristics



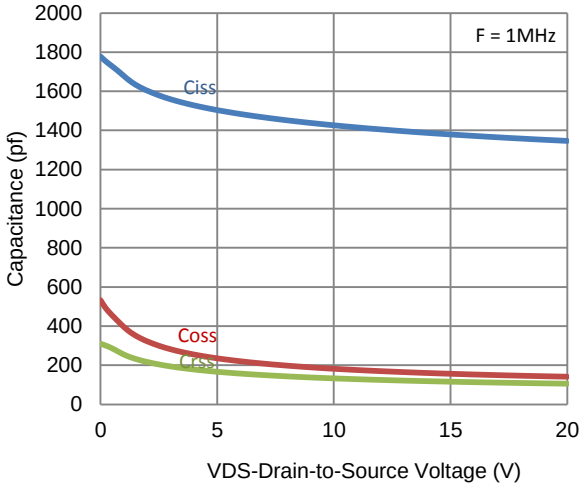
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

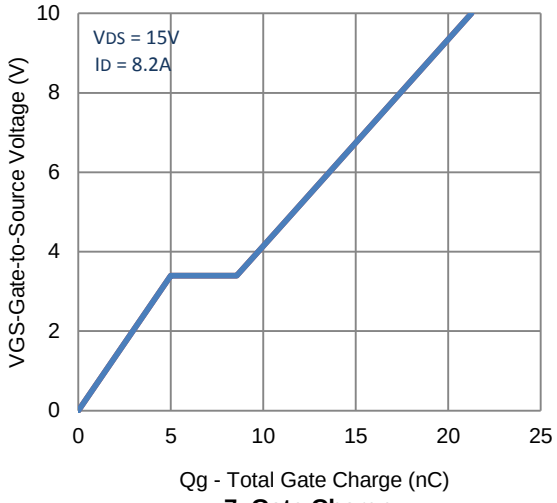


5. Output Characteristics

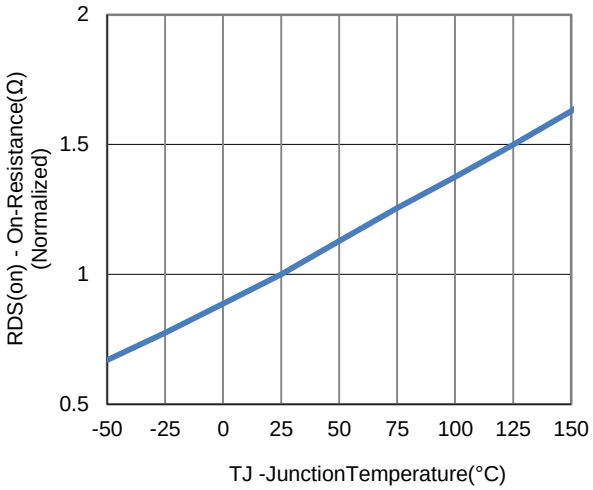


6. Capacitance

Typical Electrical Characteristics - Q2



7. Gate Charge



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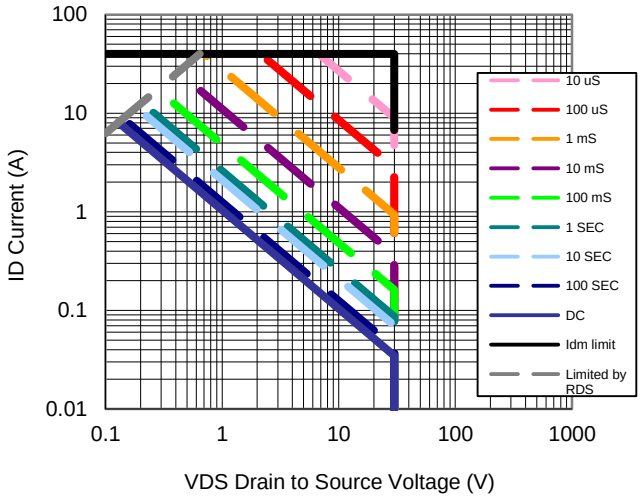
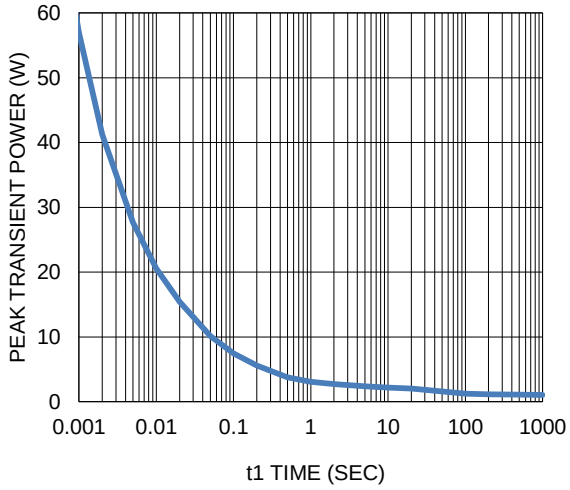
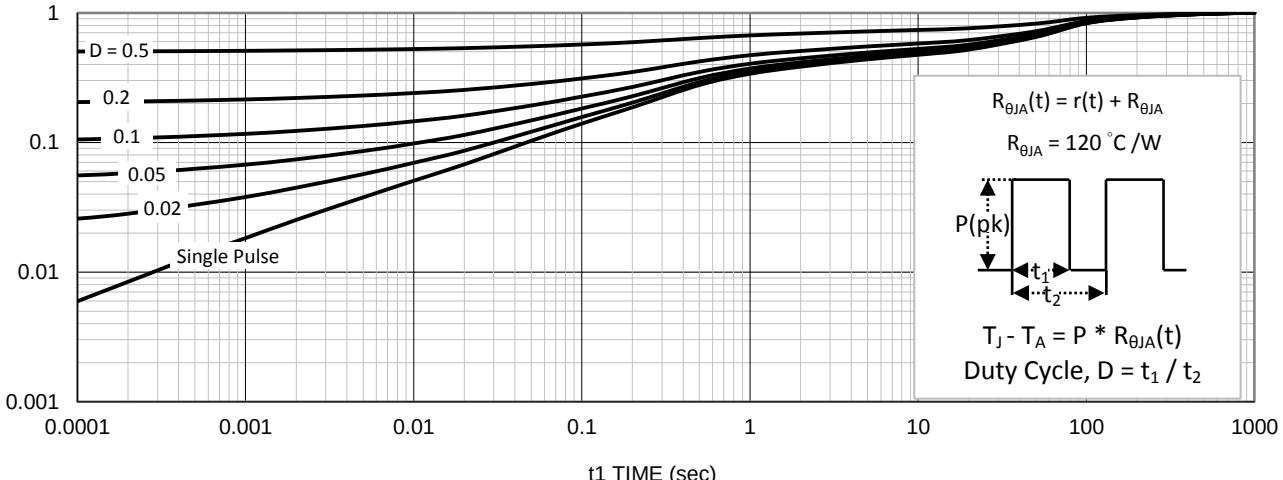


9. Safe Operating Area

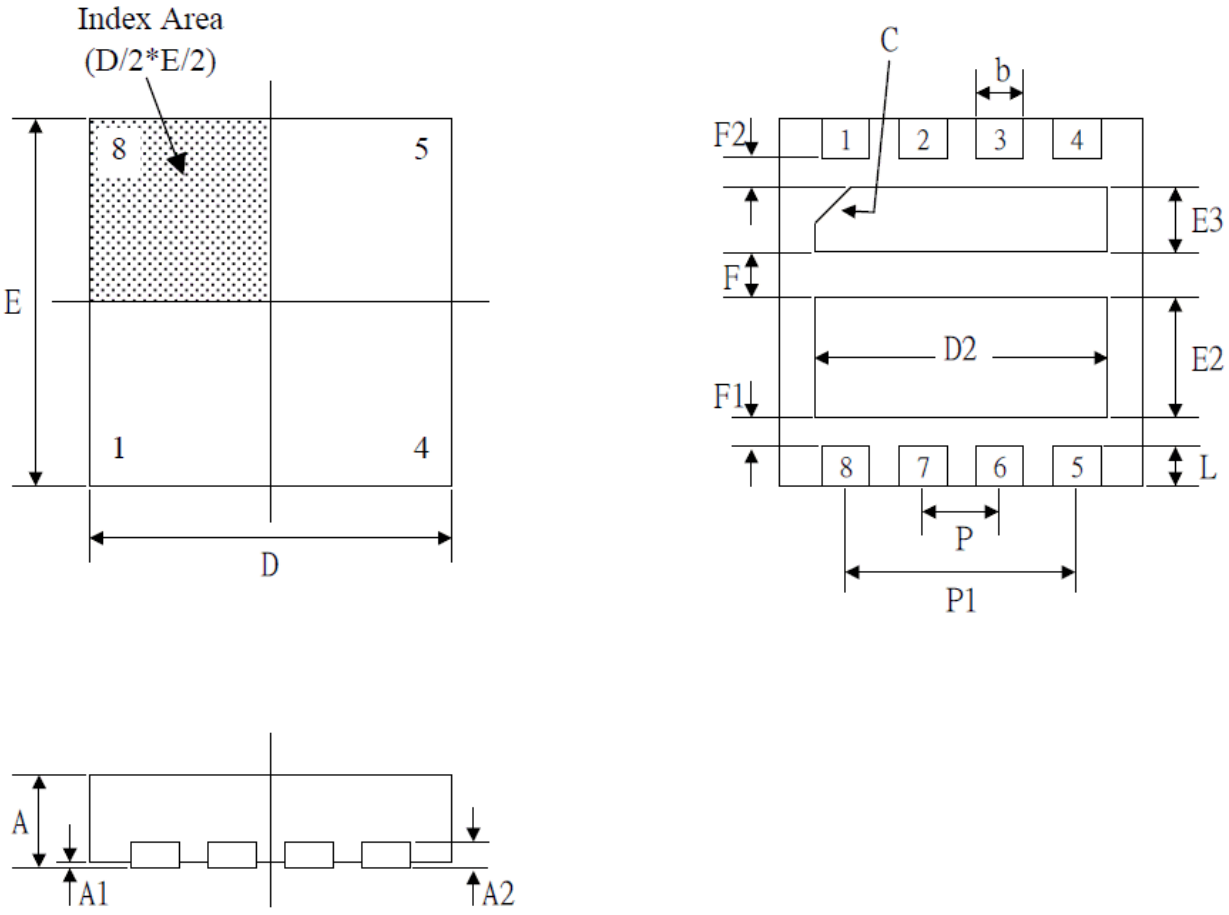


10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information



Dimension	mm			Dimension	mm		
	MIN.	NOM.	MAX.		MIN.	NOM.	MAX.
A	0.700	0.750	0.800	E2	0.940	0.990	1.100
A1	0.005	0.030	0.050	E3	0.470	0.520	0.570
A2	0.150	0.200	0.250	L	0.270	0.320	0.370
b	0.350	0.400	0.450	P	0.65 BSC		
C		0.30REF		P1	1.95 BSC		
D	2.950	3.000	3.050	F	0.360	0.350	0.460
E	2.950	3.000	3.050	F1/F2	0.200	0.250	0.300
D2	2.350	2.400	2.450				