N & P-Channel 100-V (D-S) MOSFET
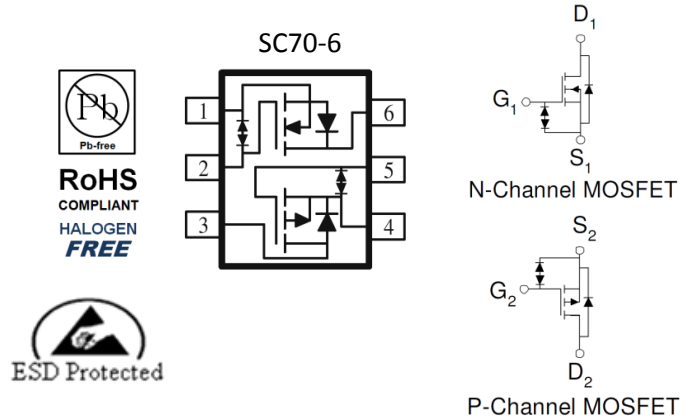
PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
100	1.2 @ V_{GS} = 10V	0.42
100	1.5 @ V_{GS} = 4.5V	0.37
-100	5.5 @ V_{GS} = -10V	-0.20
-100	6 @ V_{GS} = -4.5V	-0.19

Key Features:

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

Typical Applications:

- LED Inverter Circuits
- DC/DC Conversion Circuits
- Motor drives

SC70-6

N-Channel MOSFET

P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)					
Parameter		Symbol	Nch Limit	Pch Limit	Units
Drain-Source Voltage		V_{DS}	100	-100	V
Gate-Source Voltage		V_{GS}	±20	±20	V
Continuous Drain Current [a]	T_A=25°C	I_D	0.42	-0.20	A
Continuous Drain Current [a]	T_A=70°C	I_D	0.35	-0.16	A
Pulsed Drain Current [b]		I_{DM}	2	-1	
Continuous Source Current (Diode Conduction) [a]		I_S	0.37	-0.35	A
Power Dissipation [a]	T_A=25°C	P_D	0.3	0.3	W
Power Dissipation [a]	T_A=70°C	P_D	0.21	0.21	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150		°C

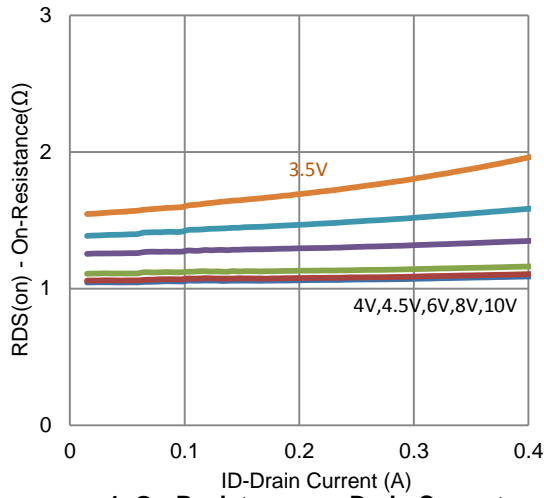| THERMAL RESISTANCE RATINGS				
Parameter		Symbol	Maximum	Units
Maximum Junction-to-Ambient [a]	t <= 10 sec	$R_{\theta JA}$	415	°C/W
Maximum Junction-to-Ambient [a]	Steady State	$R_{\theta JA}$	460	°C/W

Notes

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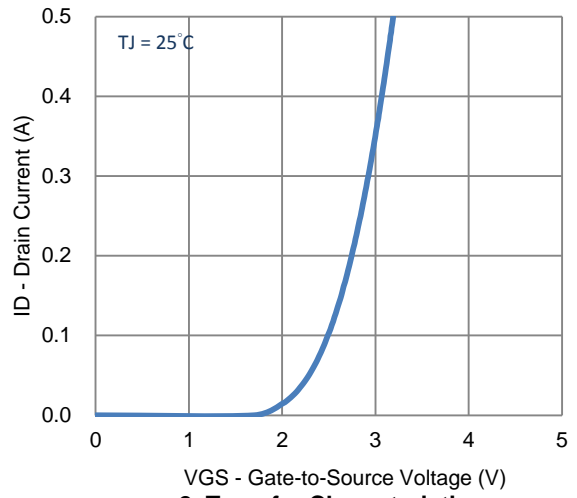
b.   Pulse width limited by maximum junction temperature

Electrical Characteristics

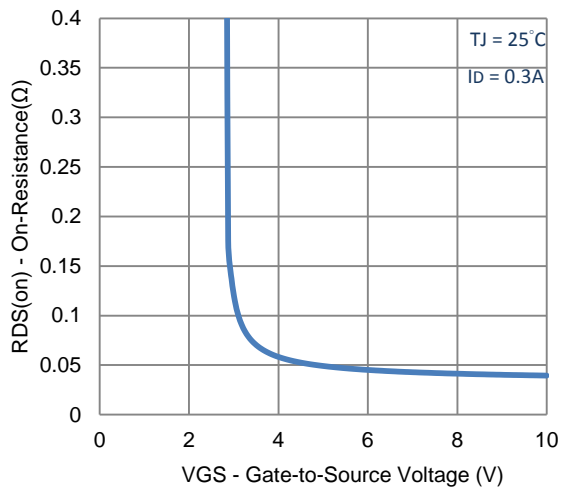| Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
Static							
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250$ uA	**(N-ch)**	1			V
		$V_{DS} = V_{GS}$, $I_D = -250$ uA	**(P-ch)**	-1			V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = \pm20$ V				±10	uA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 80$ V, $V_{GS} = 0$ V	**(N-ch)**			1	uA
		$V_{DS} = -80$ V, $V_{GS} = 0$ V	**(P-ch)**			-1	
On-State Drain Current [a]	$I_{D(on)}$	$V_{DS} = 5$ V, $V_{GS} = 10$ V	**(N-ch)**	0.7			A
		$V_{DS} = -5$ V, $V_{GS} = -10$ V	**(P-ch)**	-0.3			A
Drain-Source On-Resistance [a]	$r_{DS(on)}$	$V_{GS} = 10$ V, $I_D = 0.3$ A	**(N-ch)**			1.2	Ω
		$V_{GS} = 4.5$ V, $I_D = 0.24$ A	**(N-ch)**			1.5	
		$V_{GS} = -10$ V, $I_D = -0.15$ A	**(P-ch)**			5.5	Ω
		$V_{GS} = -4.5$ V, $I_D = -0.12$ A	**(P-ch)**			6	
Forward Transconductance [a]	g_{fs}	$V_{DS} = 15$ V, $I_D = 0.3$ A	**(N-ch)**		11		S
		$V_{DS} = -15$ V, $I_D = -0.15$ A	**(P-ch)**		10		S
Diode Forward Voltage [a]	V_{SD}	$I_S = 0.18$ A, $V_{GS} = 0$ V	**(N-ch)**		0.75		V
		$I_S = -0.17$ A, $V_{GS} = 0$ V	**(P-ch)**		-0.82		V
Dynamic [b]							
Total Gate Charge	Q_g	N - Channel $V_{DS} = 50$ V, $V_{GS} = 4.5$ V, $I_D = 0.3$ A			1.2		nC
Gate-Source Charge	Q_{gs}				0.2		
Gate-Drain Charge	Q_{gd}				0.8		
Turn-On Delay Time	$t_{d(on)}$	N - Channel $V_{DS} = 50$ V, $R_L = 166.7$ Ω, $I_D = 0.3$ A, $V_{GEN} = 10$ V, $R_{GEN} = 6$ Ω			3		ns
Rise Time	t_r				4		
Turn-Off Delay Time	$t_{d(off)}$				13		
Fall Time	t_f				5		
Input Capacitance	C_{iss}	N - Channel $V_{DS} = 15$ V, $V_{GS} = 0$ V, $f = 1$ Mhz			62		pF
Output Capacitance	C_{oss}				19		
Reverse Transfer Capacitance	C_{rss}				9		
Total Gate Charge	Q_g	P - Channel $V_{DS} = -50$ V, $V_{GS} = -4.5$ V, $I_D = -0.15$ A			1.2		nC
Gate-Source Charge	Q_{gs}				0.4		
Gate-Drain Charge	Q_{gd}				0.5		
Turn-On Delay Time	$t_{d(on)}$	P - Channel $V_{DS} = -50$ V, $R_L = 333.4$ Ω, $I_D = -0.15$ A, $V_{GEN} = -10$ V, $R_{GEN} = 6$ Ω			5		ns
Rise Time	t_r				5		
Turn-Off Delay Time	$t_{d(off)}$				10		
Fall Time	t_f				5		
Input Capacitance	C_{iss}	P - Channel $V_{DS} = -15$ V, $V_{GS} = 0$ V, $f = 1$ Mhz			84		pF
Output Capacitance	C_{oss}				18		
Reverse Transfer Capacitance	C_{rss}				9		

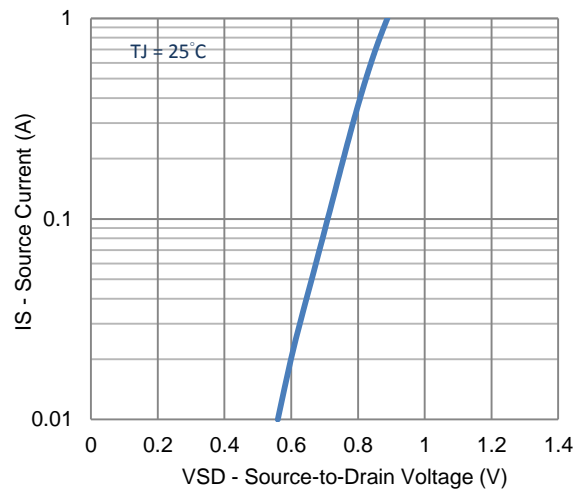## Typical Electrical Characteristics - N-channel

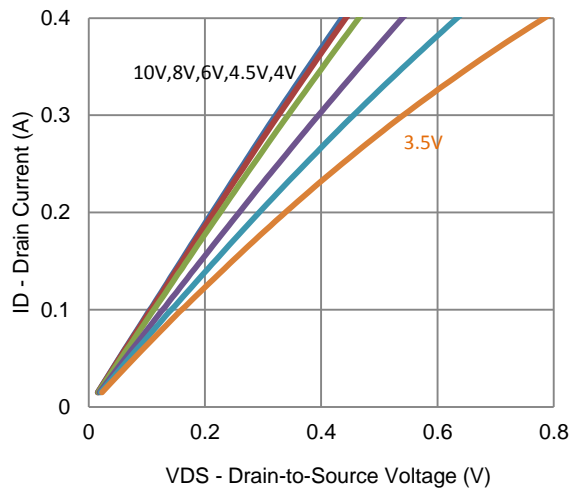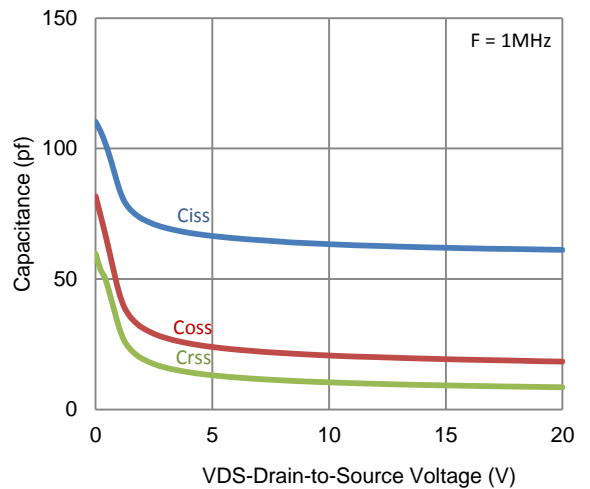**1. On-Resistance vs. Drain Current**

2. Transfer Characteristics

3. On-Resistance vs. Gate-to-Source Voltage
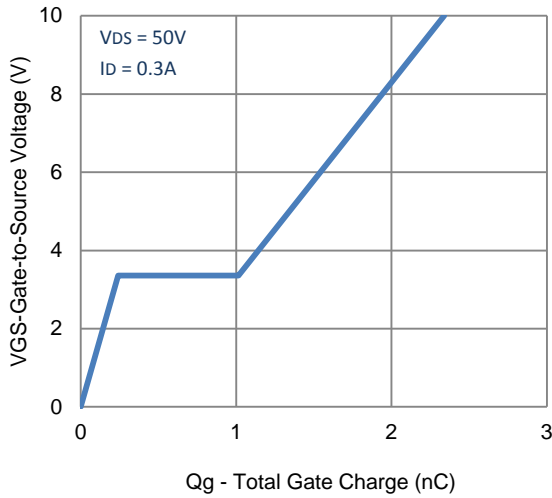
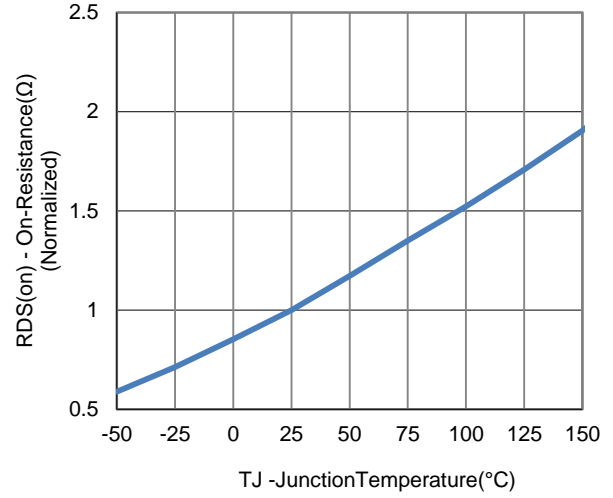**4. Drain-to-Source Forward Voltage**

5. Output Characteristics

6. Capacitance

Typical Electrical Characteristics - N-channel

VDS = 50V
ID = 0.3A

Qg - Total Gate Charge (nC)
VGS-Gate-to-Source Voltage (V)
7. Gate Charge

RDS(on) - On-Resistance(Ω) (Normalized)
TJ -JunctionTemperature(°C)
8. Normalized On-Resistance Vs Junction Temperature

ID Current (A)
VDS Drain to Source Voltage (V)

10 uS	
100 uS	
1 mS	
10 mS	
100 mS	
1 SEC	
10 SEC	
100 SEC	
DC	
Idm limit	
Limited by RDS	

9. Safe Operating Area

PEAK TRANSIENT POWER (W)
t1 TIME (SEC)
10. Single Pulse Maximum Power Dissipation

D = 0.5
0.2
0.1
0.05
0.02
Single Pulse

$R_{\theta JA}(t) = r(t) + R_{\theta JA}$

$R_{\theta JA} = 460 \, ^{\circ}C /W$

P(pk)

t_1
t_2

$T_J - T_A = P * R_{\theta JA}(t)$
Duty Cycle, $D = t_1 / t_2$
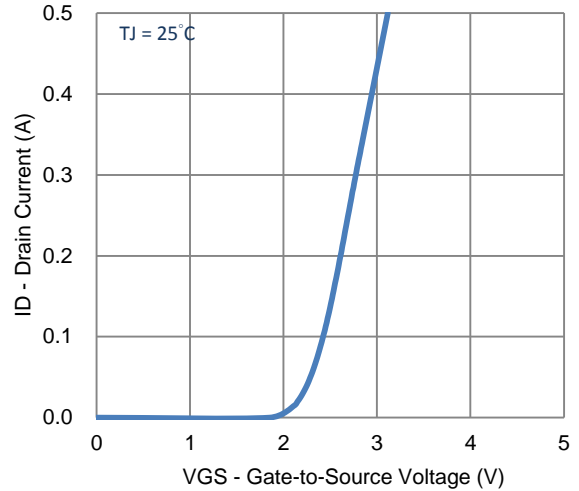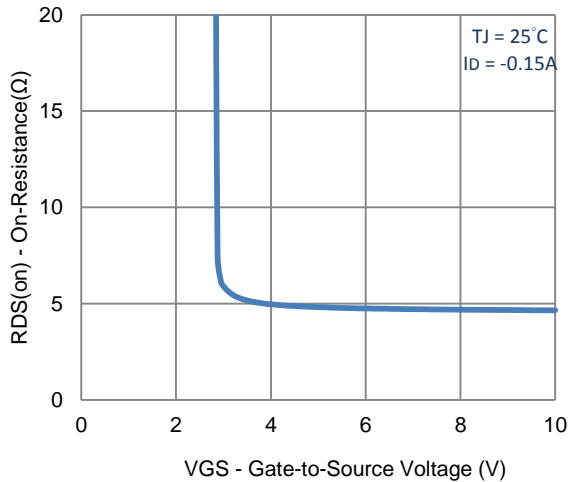
t1 TIME (sec)
11. Normalized Thermal Transient Junction to Ambient

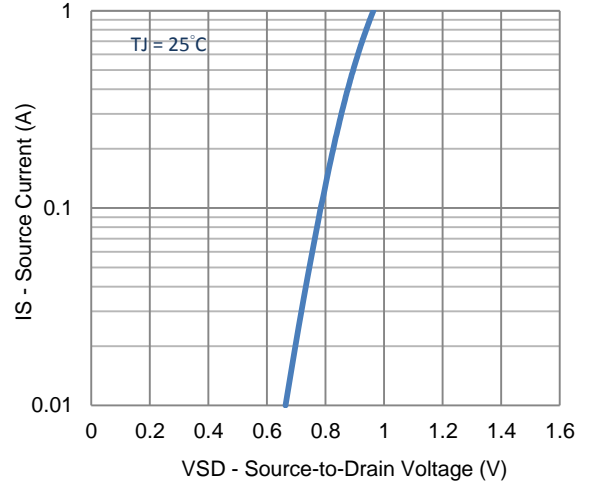## Typical Electrical Characteristics - P-channel
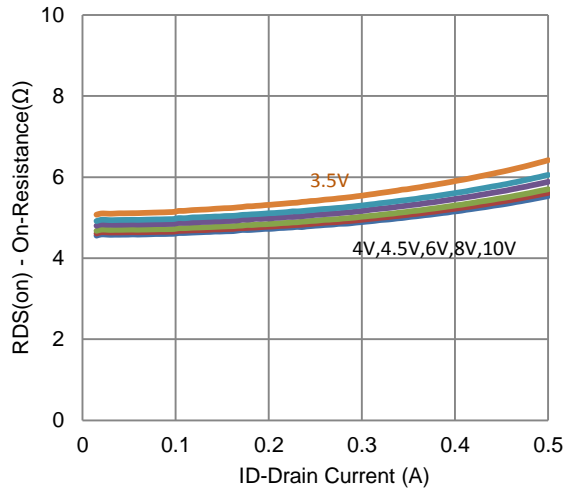
1. On-Resistance vs. Drain Current

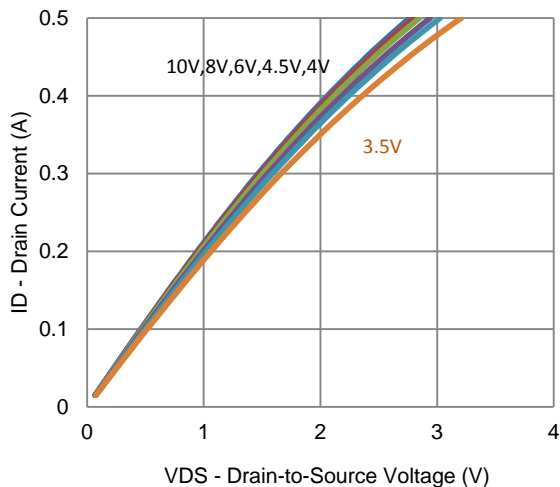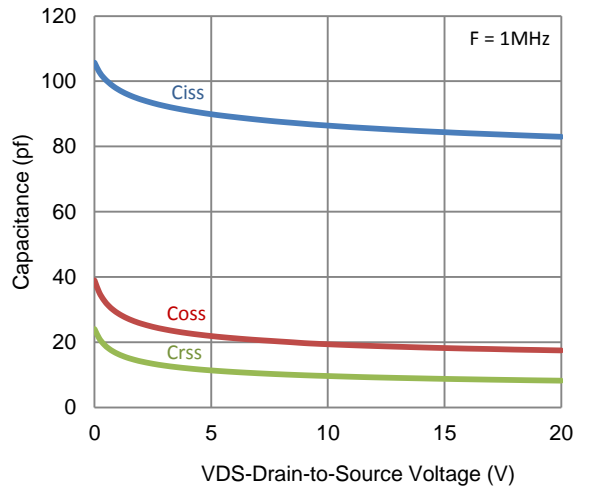**2. Transfer Characteristics**

3. On-Resistance vs. Gate-to-Source Voltage
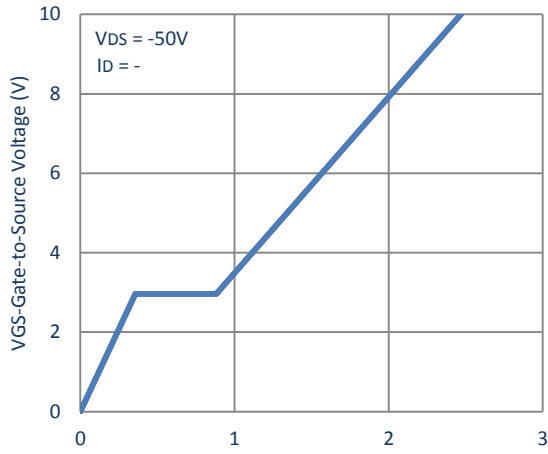
4. Drain-to-Source Forward Voltage
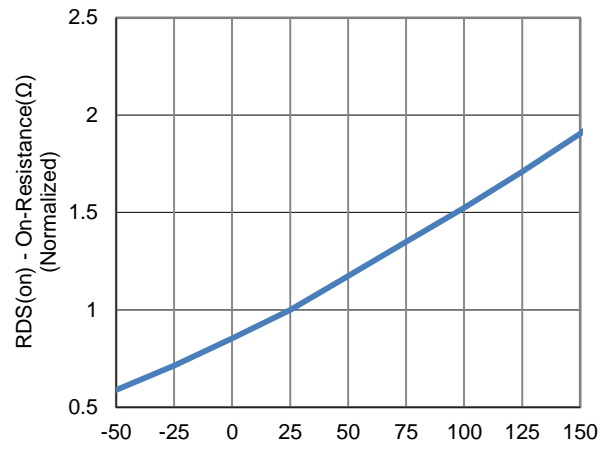
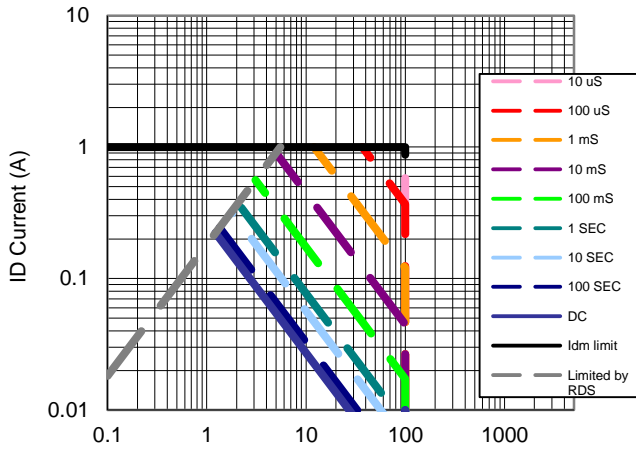**5. Output Characteristics**

6. Capacitance
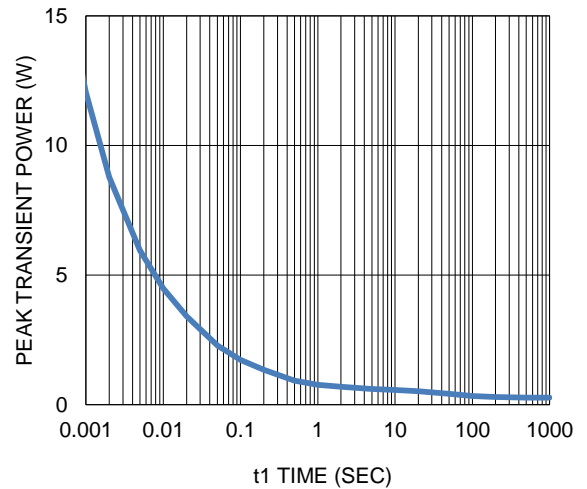
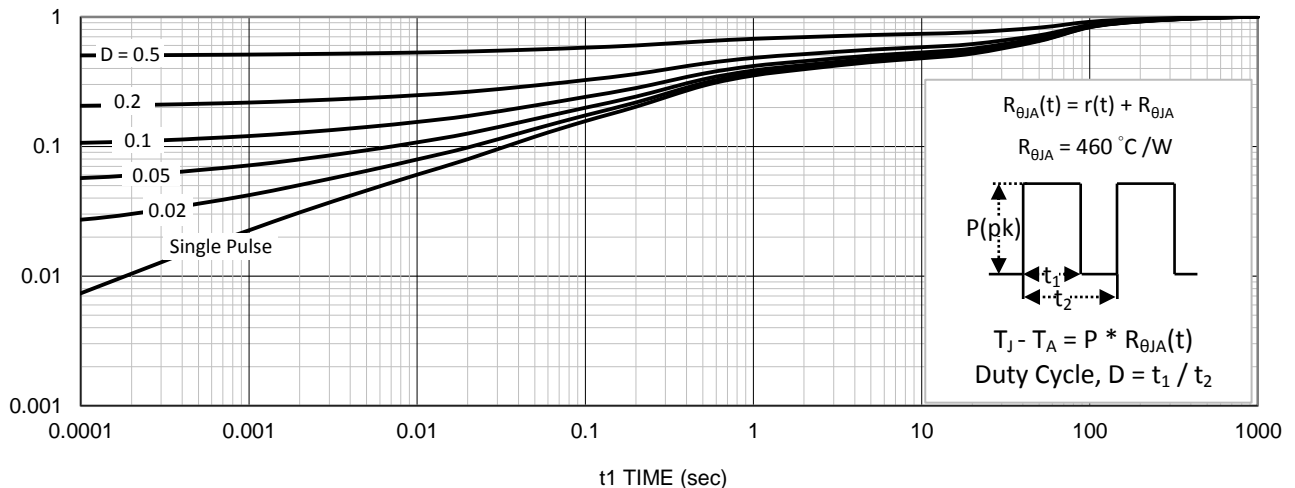## Typical Electrical Characteristics - P-channel

7. Gate Charge

8. Normalized On-Resistance Vs Junction Temperature

9. Safe Operating Area

10. Single Pulse Maximum Power Dissipation

$$R_{\theta JA}(t) = r(t) + R_{\theta JA}$$

$$R_{\theta JA} = 460\ ^\circ C\ /W$$

$$T_J - T_A = P * R_{\theta JA}(t)$$

Duty Cycle, $D = t_1 / t_2$

11. Normalized Thermal Transient Junction to Ambient

Package Information
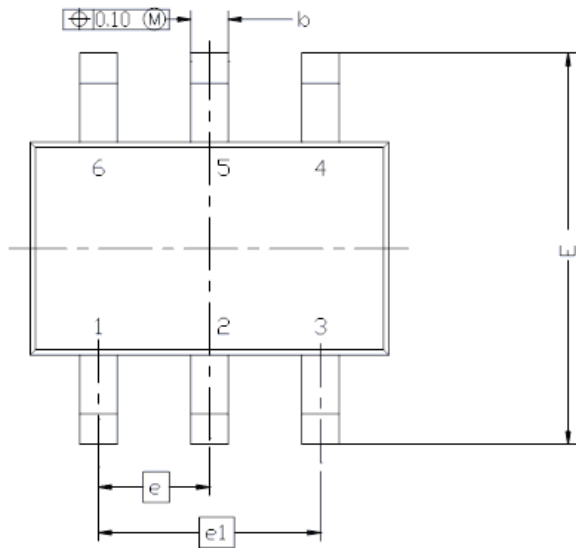
DIM.	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.900	0.95	1.10	0.035	0.037	0.043
A1	0.00	---	0.10	0.000	---	0.004
A2	0.70	0.90	1.00	0.028	0.035	0.039
b	0.15	0.22	0.30	0.006	0.016	0.012
c	0.08	0.127	0.20	0.003	0.005	0.008
D	2.10 BSC			0.083 BSC		
E	2.30 BSC			0.091 BSC		
E1	1.30 BSC			0.051 BSC		
e	0.65 BSC			0.026 BSC		
e1	1.30 BSC			0.051 BSC		
L	0.26	0.40	0.46	0.010	0.015	0.018
L2	0.254BSC			0.010BSC		
R	0.10	---	---	0.004	---	---
θ	0?	4?	8?	0?	4?	8?
θ1	7?NOM			7?NOM		