N & P-Channel 30-V (D-S) MOSFET

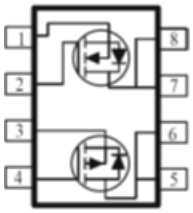
Key Features:
- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed

Typical Applications:
- DC/DC Conversion
- Power Routing
- Motor Drives

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (mΩ)	I_D (A)
30	58 @ V_{GS} = 4.5V	6.4
	82 @ V_{GS} = 2.5V	5.4
-30	112 @ V_{GS} = -4.5V	-4.6
	172 @ V_{GS} = -2.5V	-3.7

Pb-free
RoHS COMPLIANT
HALOGEN FREE

DFN5X6-8L



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)					
Parameter		**Symbol**	**Nch Limit**	**Pch Limit**	**Units**
Drain-Source Voltage		V_{DS}	30	-30	V
Gate-Source Voltage		V_{GS}	±8	±8	
Continuous Drain Current [a]	T_A=25°C	I_D	6.4	-4.6	A
	T_A=70°C		5.1	-3.7	
Pulsed Drain Current [b]		I_{DM}	30	-30	
Continuous Source Current (Diode Conduction) [a]		I_S	4.4	-3.6	A
Power Dissipation [a]	T_A=25°C	P_D	3.5	3.5	W
	T_A=70°C		2.2	2.2	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150		°C

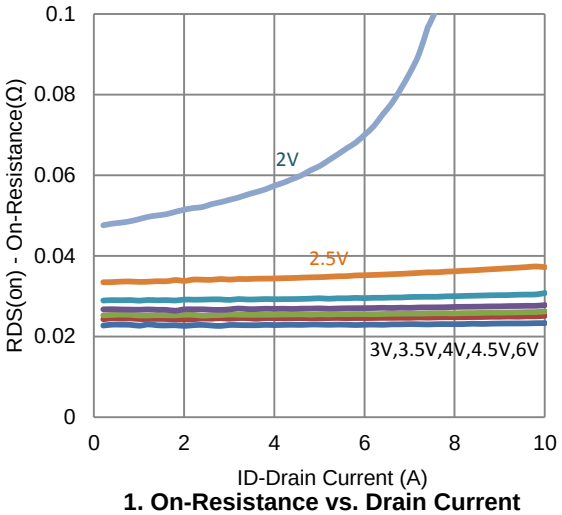
THERMAL RESISTANCE RATINGS				
Parameter		**Symbol**	**Maximum**	**Units**
Maximum Junction-to-Ambient [a]	t <= 10 sec	$R_{\theta JA}$	50	°C/W
	Steady State		90	

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

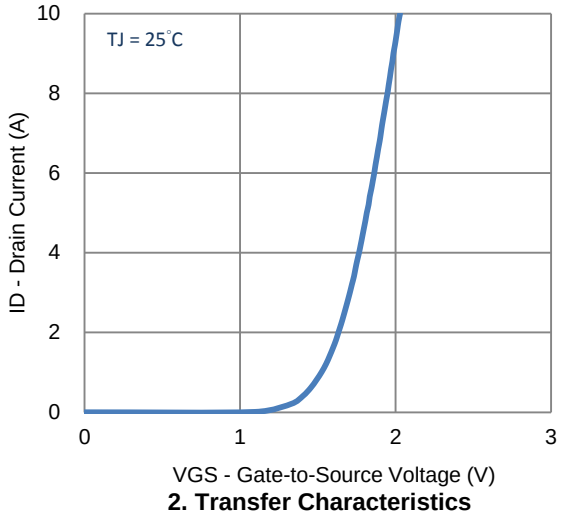
Electrical Characteristics

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)**	0.4			V
		V_{DS} = V_{GS}, I_D = -250 uA **(P-ch)**	-0.4			V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±8 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 24 V, V_{GS} = 0 V **(N-ch)**			1	uA
		V_{DS} = -24 V, V_{GS} = 0 V **(P-ch)**			-1	
On-State Drain Current [a]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 4.5 V **(N-ch)**	8			A
		V_{DS} = -5 V, V_{GS} = -4.5 V **(P-ch)**	-5.8			A
Drain-Source On-Resistance [a]	$r_{DS(on)}$	V_{GS} = 4.5 V, I_D = 5 A **(N-ch)**			58	mΩ
		V_{GS} = 2.5 V, I_D = 4 A **(N-ch)**			82	
		V_{GS} = -4.5 V, I_D = -3.7 A **(P-ch)**			112	mΩ
		V_{GS} = -2.5 V, I_D = -2.9 A **(P-ch)**			172	
Forward Transconductance [a]	g_{fs}	V_{DS} = 15 V, I_D = 5 A **(N-ch)**		11		S
		V_{DS} = -15 V, I_D = -3.7 A **(P-ch)**		10		S
Diode Forward Voltage [a]	V_{SD}	I_S = 2.2 A, V_{GS} = 0 V **(N-ch)**		0.77		V
		I_S = -1.8 A, V_{GS} = 0 V **(P-ch)**		-0.83		V
Dynamic [b]						
Total Gate Charge	Q_g	N - Channel V_{DS} = 15 V, V_{GS} = 4.5 V, I_D = 5 A		6.6		nC
Gate-Source Charge	Q_{gs}			2.0		
Gate-Drain Charge	Q_{gd}			1.7		
Turn-On Delay Time	$t_{d(on)}$	N - Channel V_{DS} = 15 V, R_L = 3 Ω, I_D = 5 A, V_{GEN} = 4.5 V, R_{GEN} = 6 Ω		7		ns
Rise Time	t_r			21		
Turn-Off Delay Time	$t_{d(off)}$			25		
Fall Time	t_f			13		
Input Capacitance	C_{iss}	N - Channel V_{DS} = 15 V, V_{GS} = 0 V, f = 1 Mhz		449		pF
Output Capacitance	C_{oss}			70		
Reverse Transfer Capacitance	C_{rss}			56		
Total Gate Charge	Q_g	P - Channel V_{DS} = -15 V, V_{GS} = -4.5 V, I_D = -3.7 A		7.8		nC
Gate-Source Charge	Q_{gs}			2.0		
Gate-Drain Charge	Q_{gd}			2.1		
Turn-On Delay Time	$t_{d(on)}$	P - Channel V_{DS} = -15 V, R_L = 4.1 Ω, I_D = -3.7 A, V_{GEN} = -4.5 V, R_{GEN} = 6 Ω		87		ns
Rise Time	t_r			12		
Turn-Off Delay Time	$t_{d(off)}$			28		
Fall Time	t_f			14		
Input Capacitance	C_{iss}	P - Channel V_{DS} = -15 V, V_{GS} = 0 V, f = 1 Mhz		683		pF
Output Capacitance	C_{oss}			90		
Reverse Transfer Capacitance	C_{rss}			75		

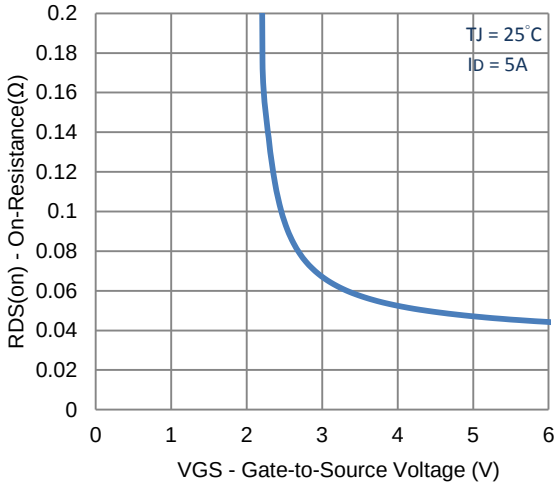
Typical Electrical Characteristics - N-channel



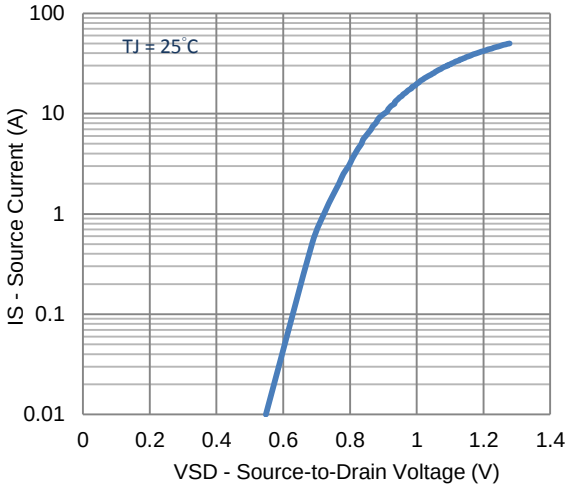
1. On-Resistance vs. Drain Current



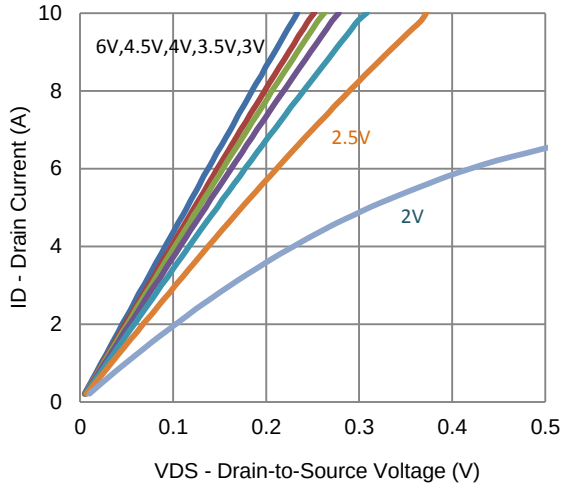
2. Transfer Characteristics



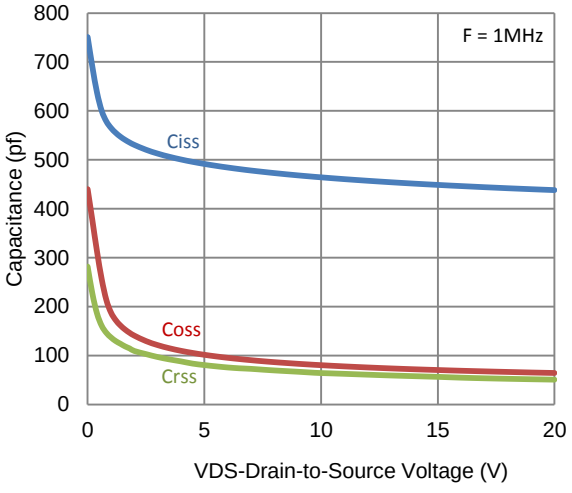
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

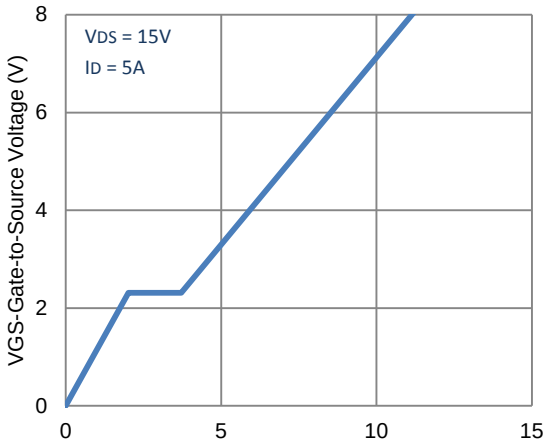


5. Output Characteristics

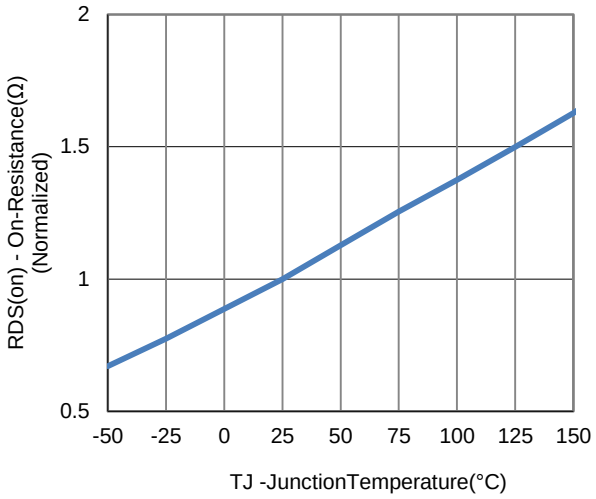


6. Capacitance

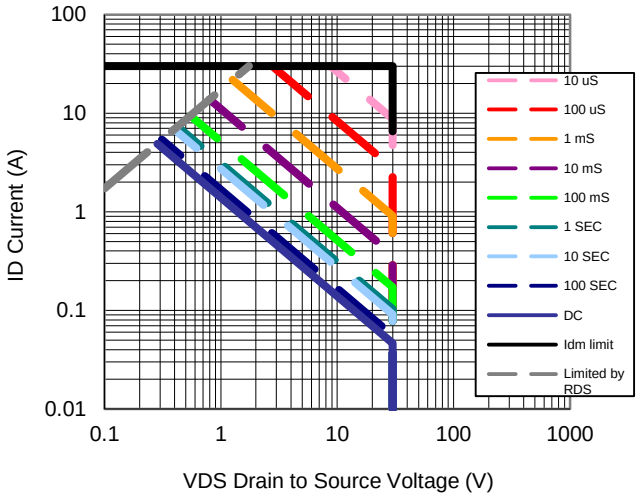
Typical Electrical Characteristics - N-channel



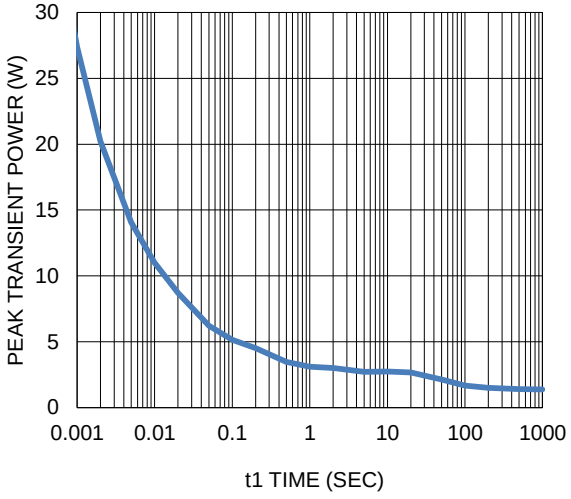
7. Gate Charge



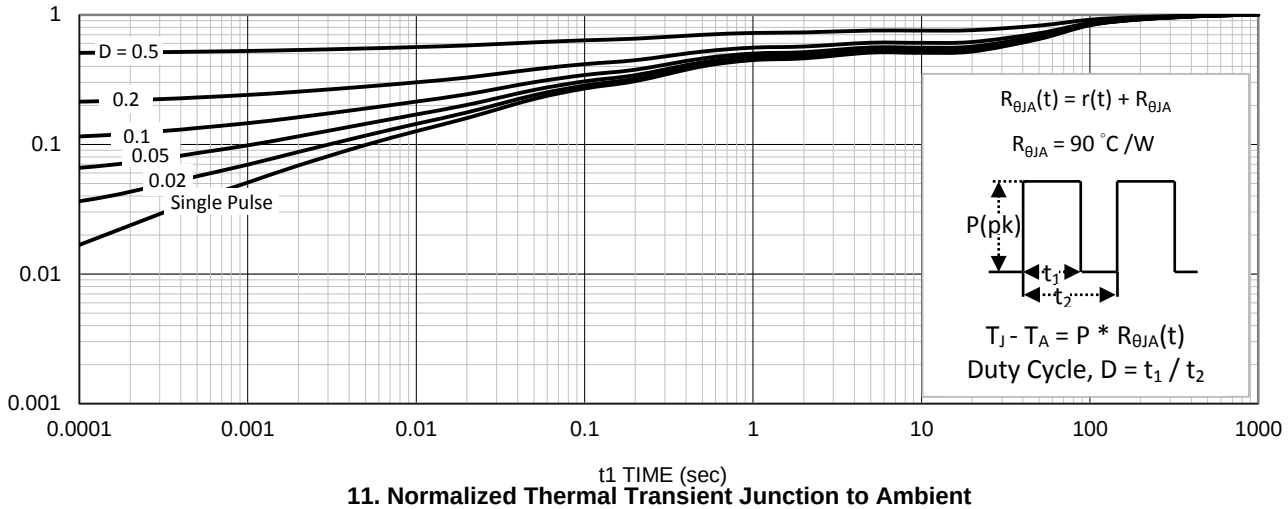
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

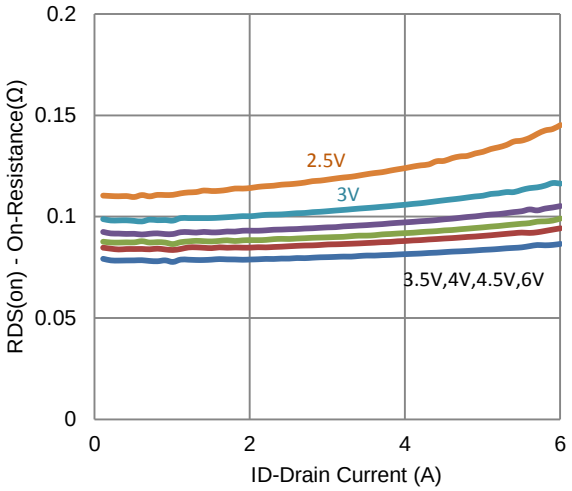


10. Single Pulse Maximum Power Dissipation

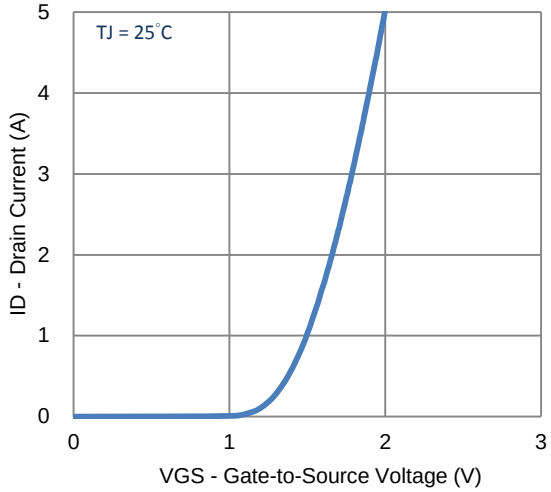


11. Normalized Thermal Transient Junction to Ambient

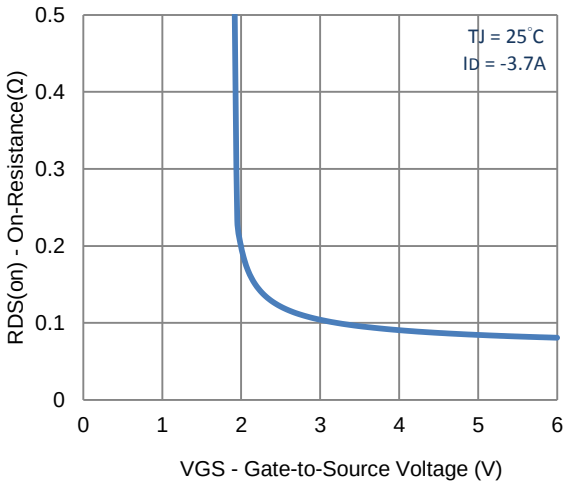
Typical Electrical Characteristics - P-channel



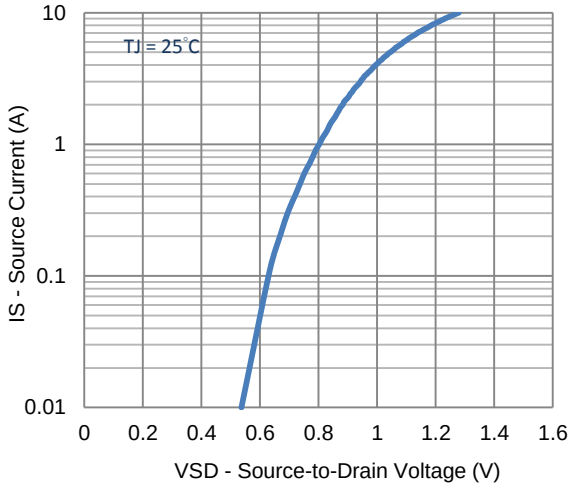
1. On-Resistance vs. Drain Current



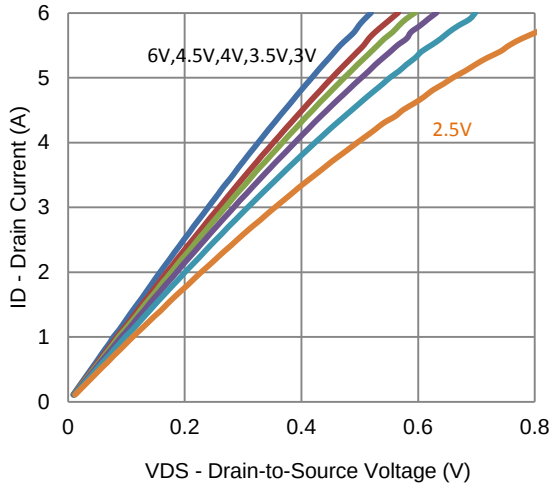
2. Transfer Characteristics



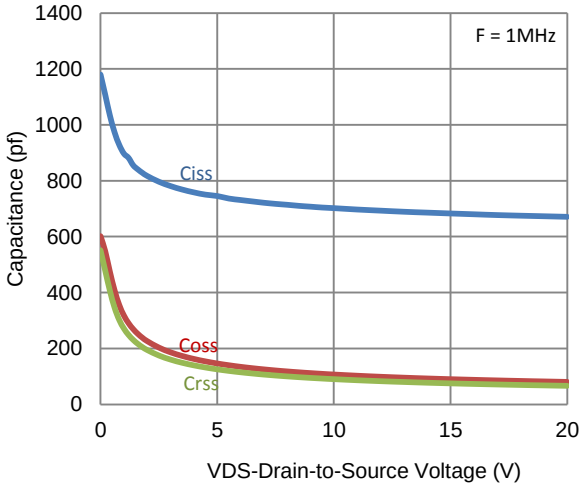
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

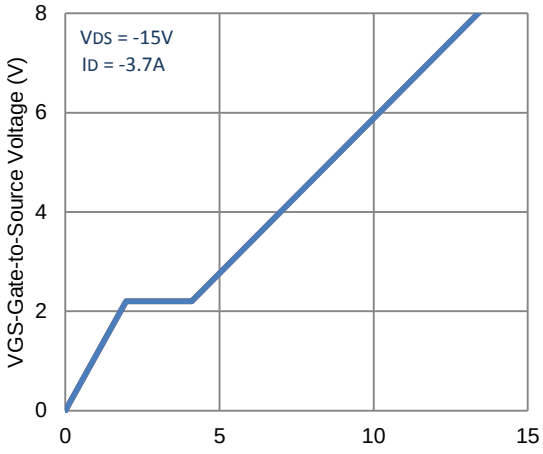


5. Output Characteristics

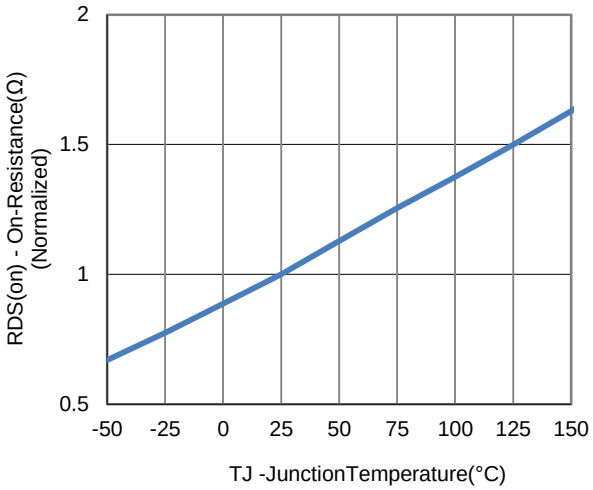


6. Capacitance

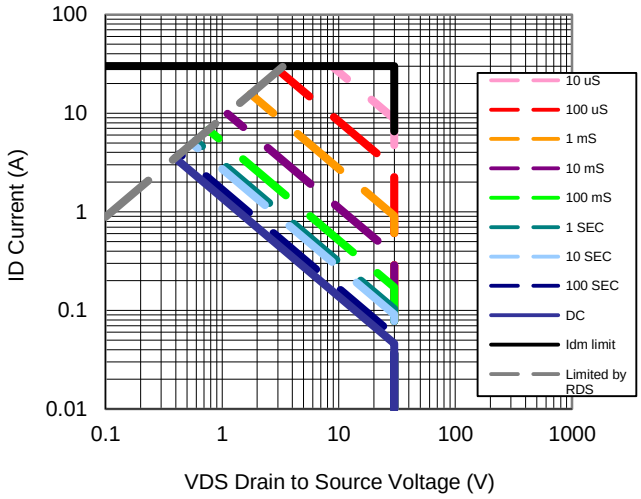
Typical Electrical Characteristics - P-channel



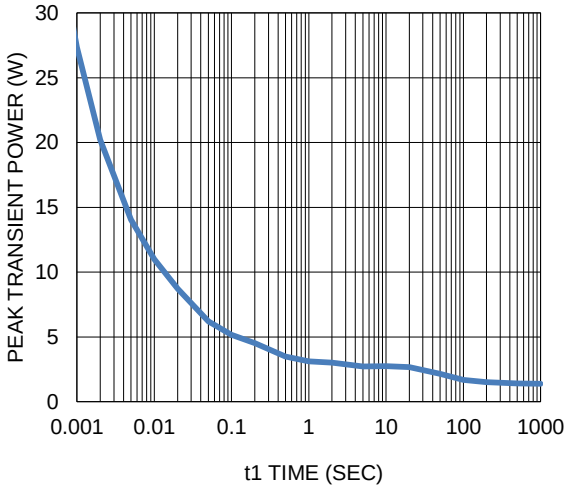
7. Gate Charge



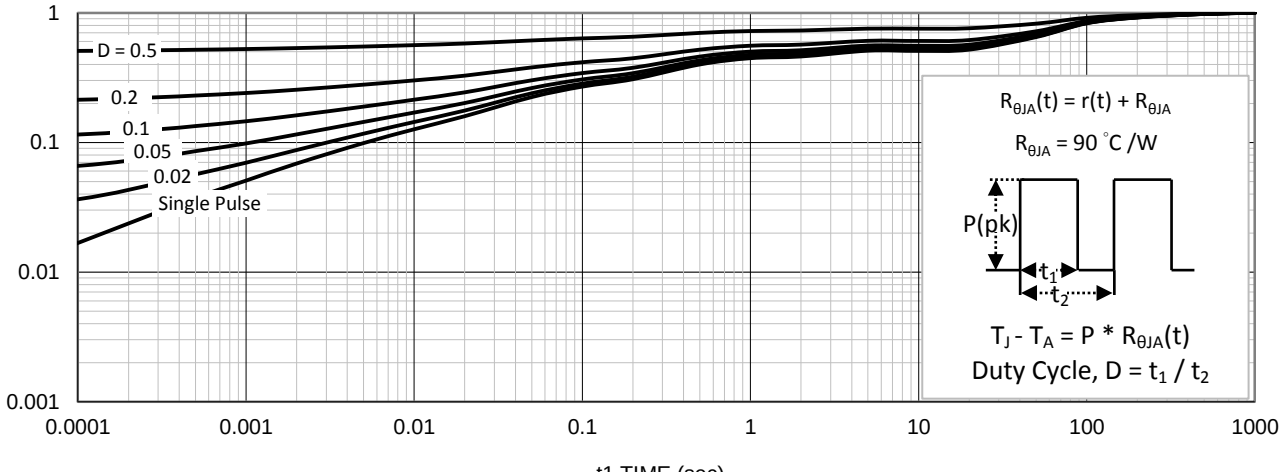
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

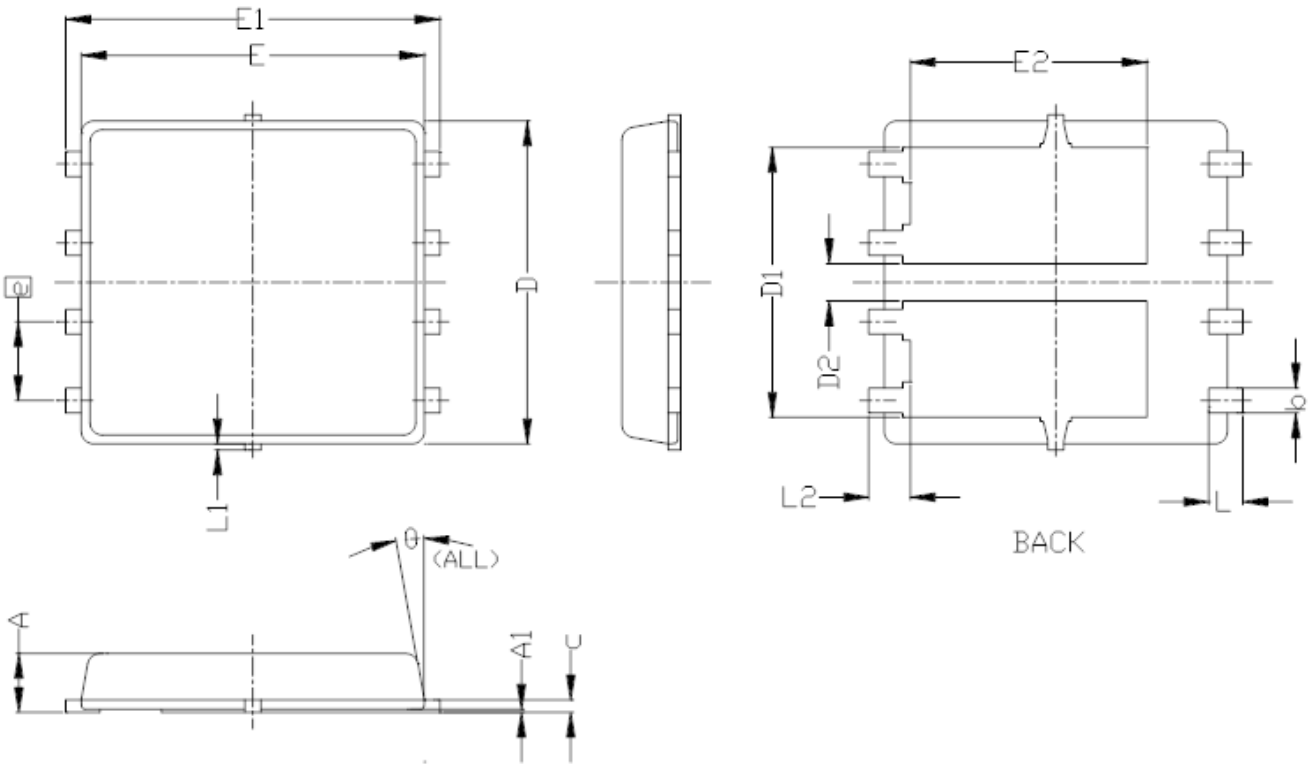


10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.85	0.95	1.00	0.033	0.037	0.039
A1	0.00	——	0.05	0.000	——	0.002
b	0.30	0.40	0.50	0.012	0.016	0.020
c	0.15	0.20	0.25	0.006	0.008	0.010
D		5.20 BSC			0.205 BSC	
D1		4.35 BSC			0.171 BSC	
D2	0.50	0.60	0.75	0.020	0.024	0.030
E		5.55 BSC			0.219 BSC	
E1		6.05 BSC			0.238 BSC	
E2		3.82 BSC			0.150 BSC	
e		1.27 BSC			0.050 BSC	
L	0.45	0.55	0.65	0.018	0.022	0.026
L1	0	---	0.15	0	---	0.006
L2		0.68 REF			0.027 REF	
θ	0°	---	10°	0°	---	10°