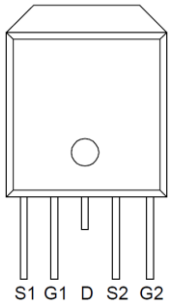
N & P-Channel 60-V (D-S) MOSFET

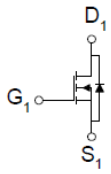
PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (mΩ)	I_D (A)
60	28 @ V_{GS} = 10V	35
	35 @ V_{GS} = 4.5V	31
-60	80 @ V_{GS} = -10V	-20
	105 @ V_{GS} = -4.5V	-18

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

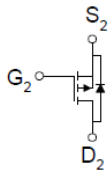
Typical Applications:
- White LED boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits

Pb-free
RoHS COMPLIANT
HALOGEN FREE





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}	60	-60	V
Gate-Source Voltage		V_{GS}	±20	±20	
Continuous Drain Current [a]	T_C=25°C	I_D	35	-20	A
Pulsed Drain Current [b]		I_{DM}	140	-80	
Continuous Source Current (Diode Conduction) [a]	T_C=25°C	I_S	35	-20	A
Power Dissipation [a]	T_C=25°C	P_D	50	50	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	T_J, T_{stg}	-55 to 175	°C

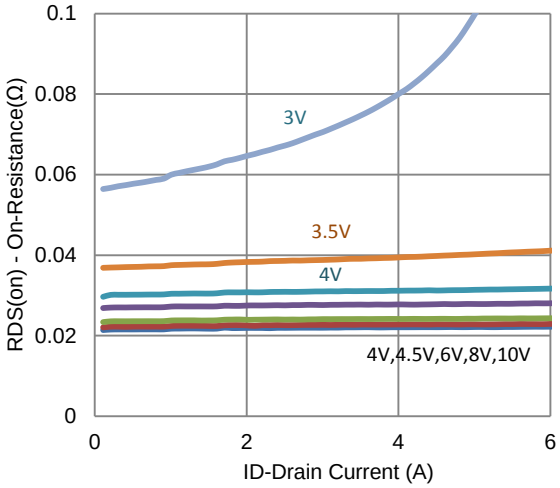
THERMAL RESISTANCE RATINGS			
Parameter	**Symbol**	**Maximum**	**Units**
Maximum Junction-to-Ambient [c]	$R_{\theta JA}$	50	°C/W
Maximum Junction-to-Case	$R_{\theta JC}$	3	

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

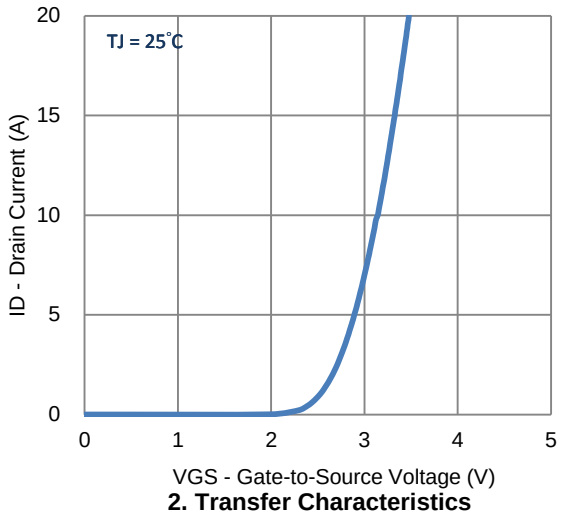
Electrical Characteristics

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 uA **(Nch)**	1			V
		V_{DS} = V_{GS}, I_D = -250 uA **(Pch)**	-1			V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 48 V, V_{GS} = 0 V **(Nch)**			1	uA
		V_{DS} = -48 V, V_{GS} = 0 V **(Pch)**			-1	
On-State Drain Current [a]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V **(Nch)**	45			A
		V_{DS} = -5 V, V_{GS} = -10 V **(Pch)**	-25			A
Drain-Source On-Resistance [a]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 20 A **(Nch)**			24	mΩ
		V_{GS} = 4.5 V, I_D = 16 A **(Nch)**			30	
		V_{GS} = -10 V, I_D = -10 A **(Pch)**			85	mΩ
		V_{GS} = -4.5 V, I_D = -8 A **(Pch)**			105	
Forward Transconductance [a]	g_{fs}	V_{DS} = 15 V, I_D = 20 A **(Nch)**		15		S
		V_{DS} = -15 V, I_D = -10 A **(Pch)**		11		S
Diode Forward Voltage [a]	V_{SD}	I_S = 17 A, V_{GS} = 0 V **(Nch)**		0.89		V
		I_S = -10 A, V_{GS} = 0 V **(Pch)**		-0.98		V
Dynamic [b]						
Total Gate Charge	Q_g	N - Channel V_{DS} = 30 V, V_{GS} = 4.5 V, I_D = 20 A		9		nC
Gate-Source Charge	Q_{gs}			3		
Gate-Drain Charge	Q_{gd}			4		
Turn-On Delay Time	$t_{d(on)}$	N - Channel V_{DS} = 30 V, R_L = 1.5 Ω, I_D = 20 A, V_{GEN} = 10 V, R_{GEN} = 6 Ω		5		ns
Rise Time	t_r			5		
Turn-Off Delay Time	$t_{d(off)}$			27		
Fall Time	t_f			8		
Input Capacitance	C_{iss}	N - Channel V_{DS} = 15 V, V_{GS} = 0 V, f = 1 Mhz		1422		pF
Output Capacitance	C_{oss}			84		
Reverse Transfer Capacitance	C_{rss}			79		
Total Gate Charge	Q_g	P - Channel V_{DS} = -30 V, V_{GS} = 4.5 V, I_D = -10 A		10		nC
Gate-Source Charge	Q_{gs}			5		
Gate-Drain Charge	Q_{gd}			4		
Turn-On Delay Time	$t_{d(on)}$	P - Channel V_{DS} = -30 V, R_L = 3 Ω, I_D = -10 A, V_{GEN} = -10 V, R_{GEN} = 6 Ω		5		ns
Rise Time	t_r			4		
Turn-Off Delay Time	$t_{d(off)}$			30		
Fall Time	t_f			11		
Input Capacitance	C_{iss}	P - Channel V_{DS} = -15 V, V_{GS} = 0 V, f = 1 Mhz		1143		pF
Output Capacitance	C_{oss}			84		
Reverse Transfer Capacitance	C_{rss}			60		

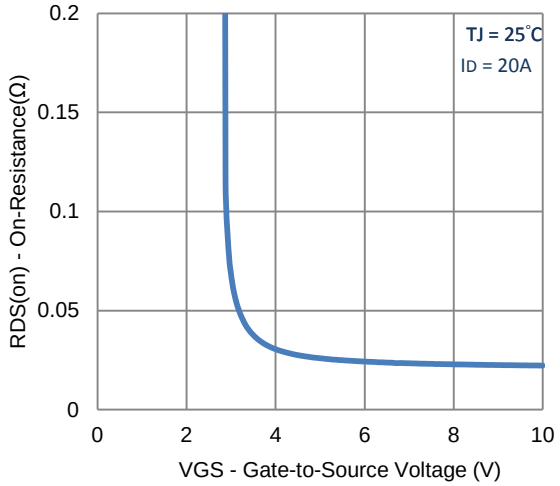
Typical Electrical Characteristics - N-channel



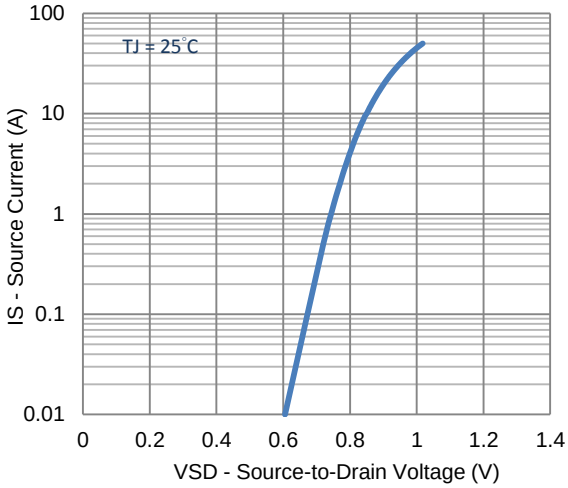
1. On-Resistance vs. Drain Current



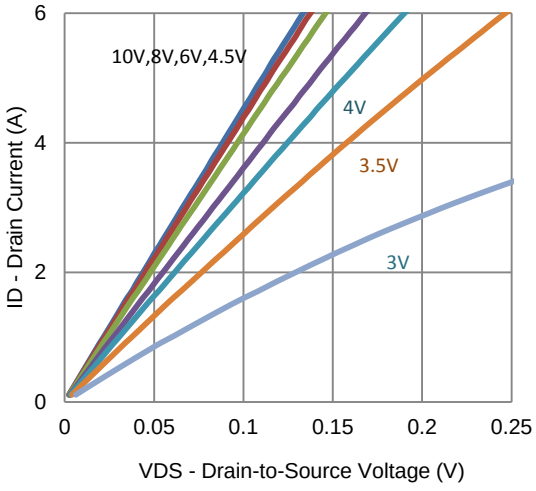
2. Transfer Characteristics



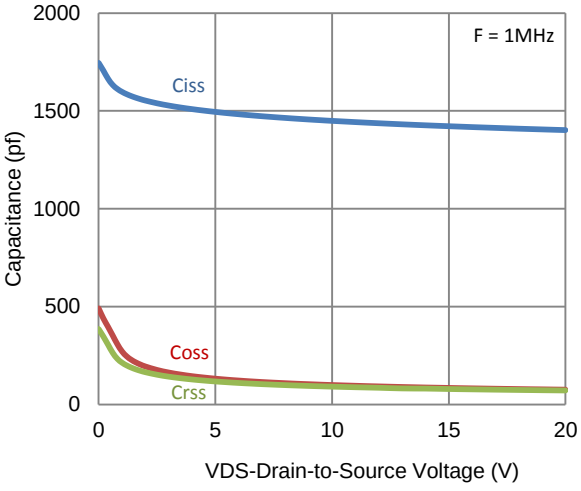
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

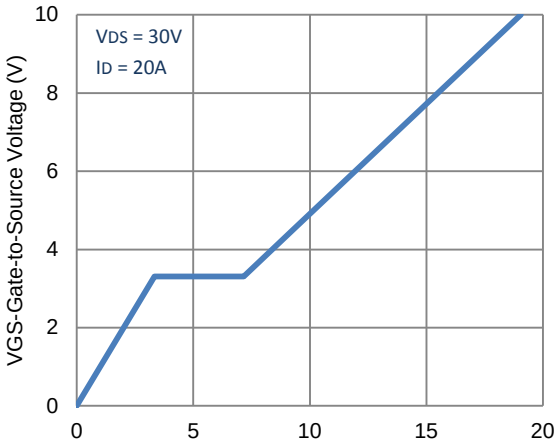


5. Output Characteristics

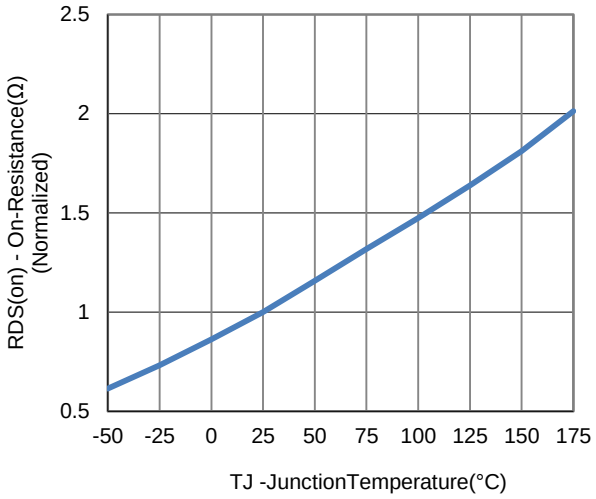


6. Capacitance

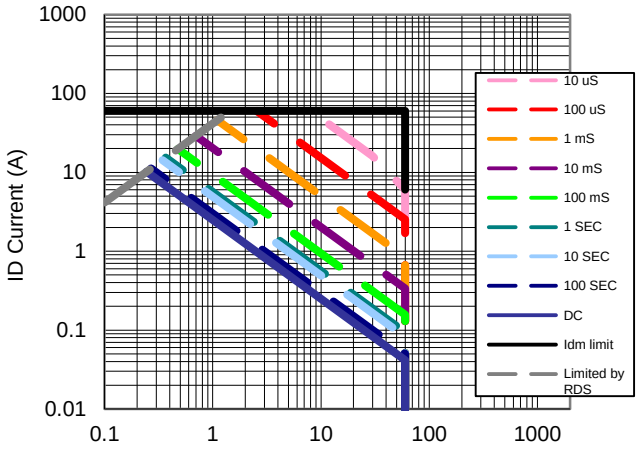
Typical Electrical Characteristics - N-channel



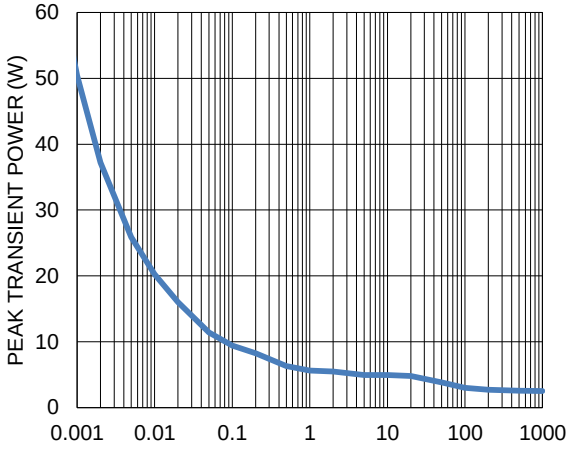
7. Gate Charge



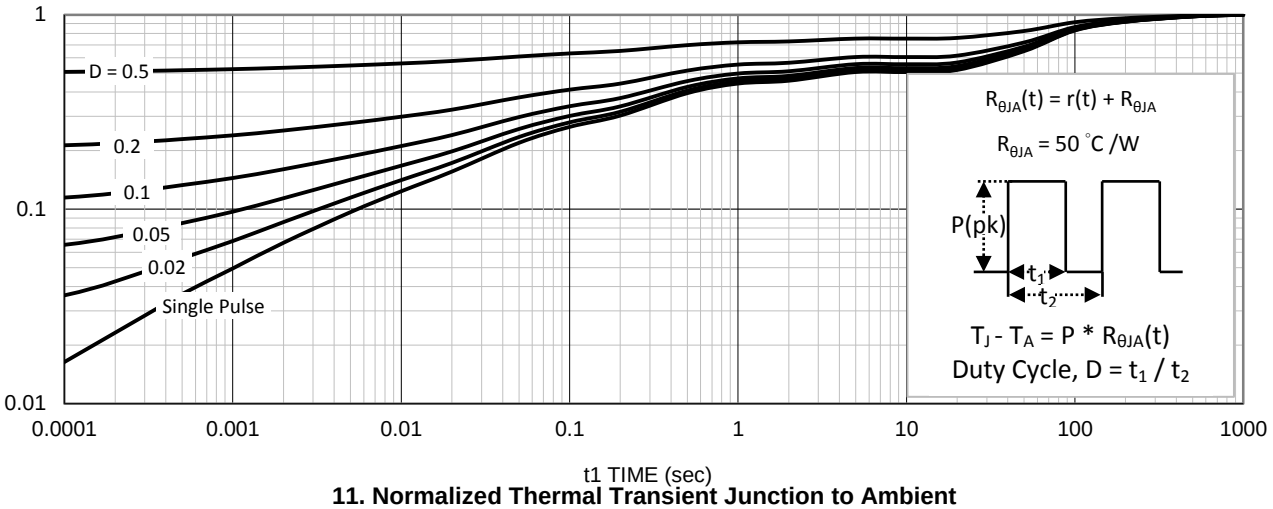
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

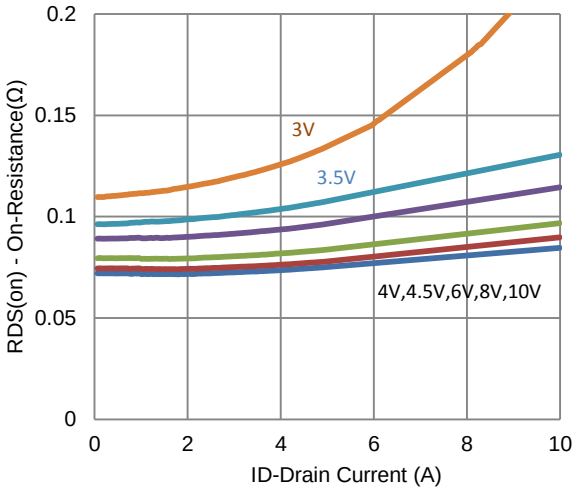


10. Single Pulse Maximum Power Dissipation

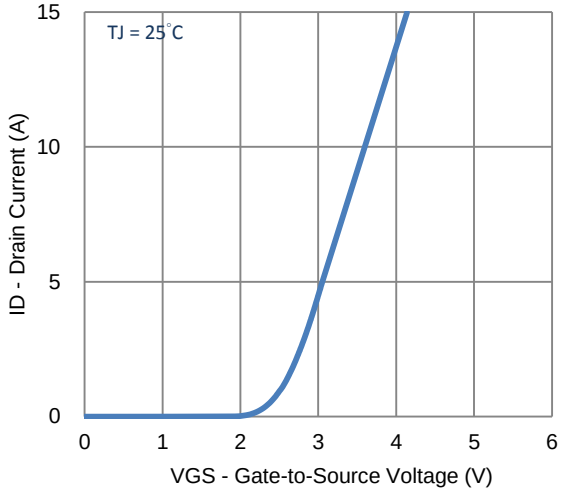


11. Normalized Thermal Transient Junction to Ambient

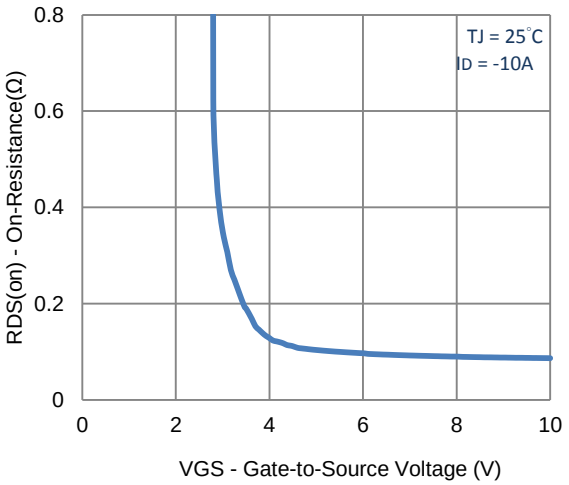
Typical Electrical Characteristics - P-channel



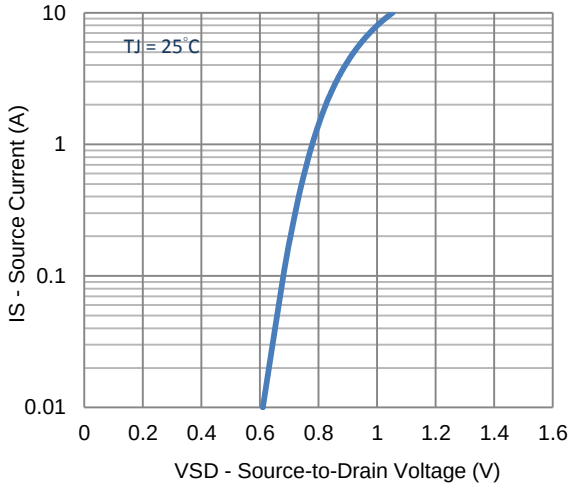
1. On-Resistance vs. Drain Current



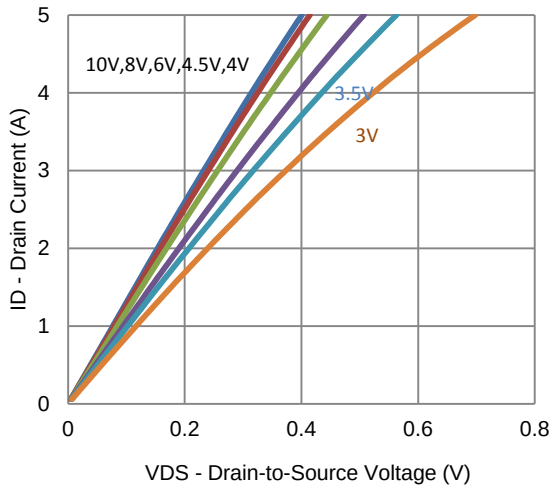
2. Transfer Characteristics



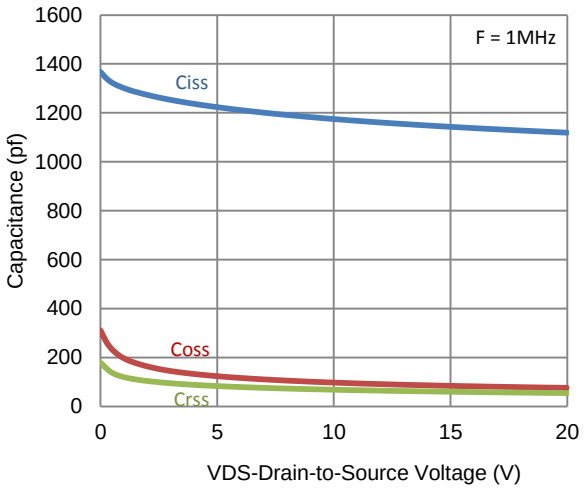
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage



5. Output Characteristics



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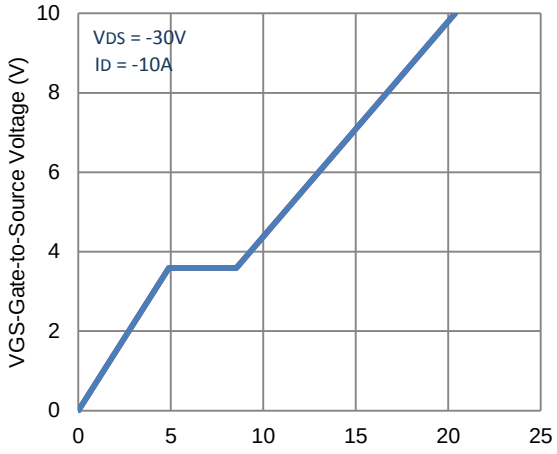
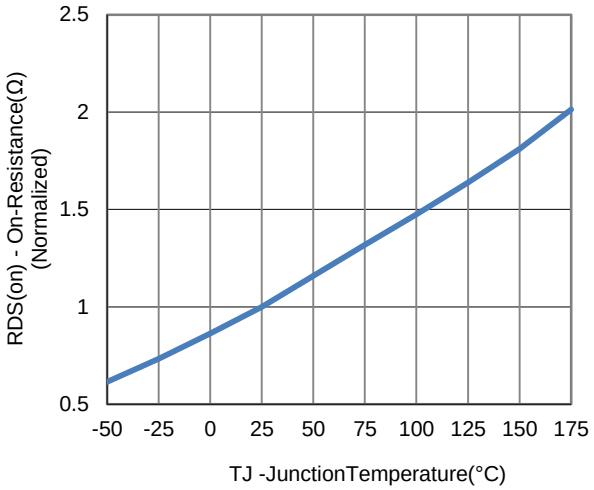
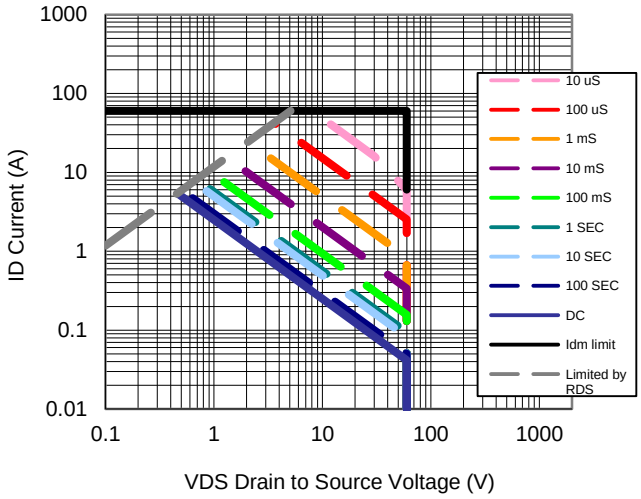
Typical Electrical Characteristics - P-channel



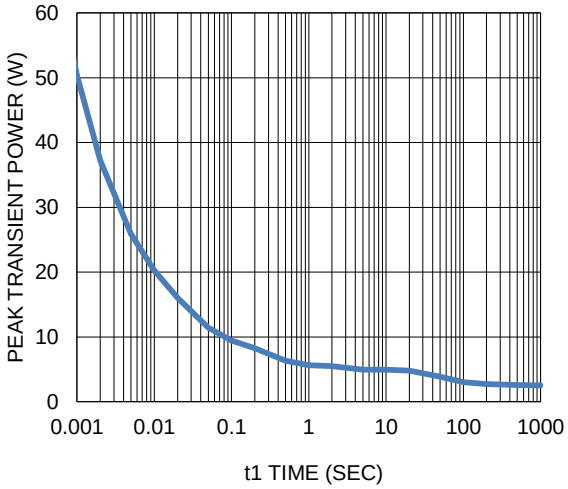
7. Gate Charge



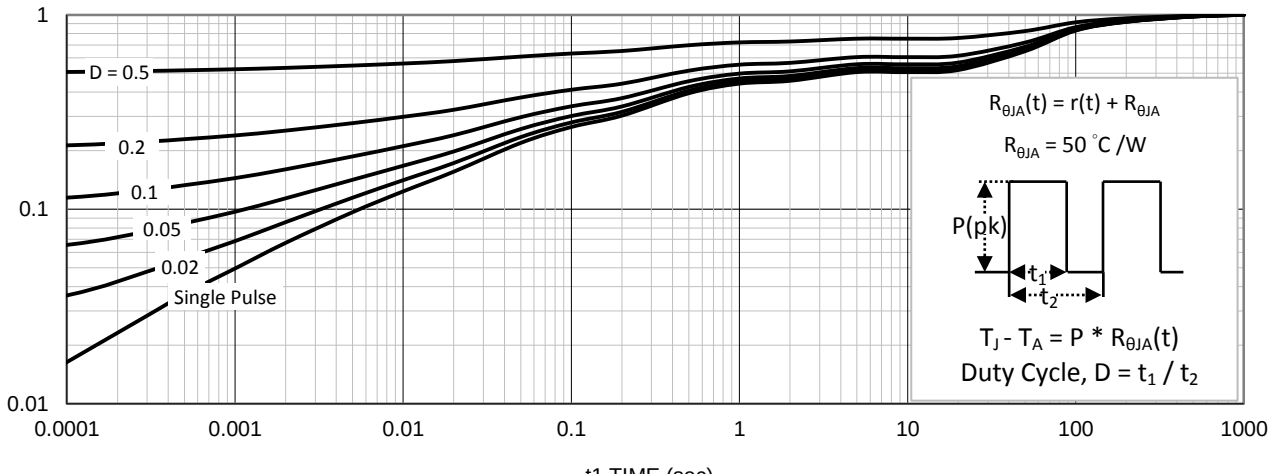
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

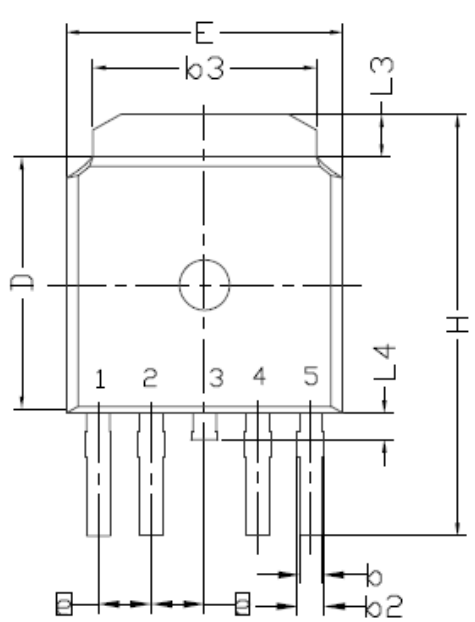


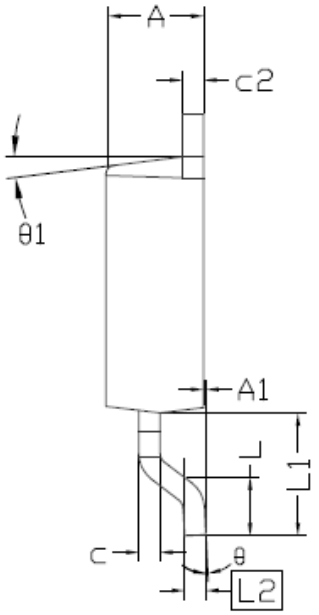
10. Single Pulse Maximum Power Dissipation

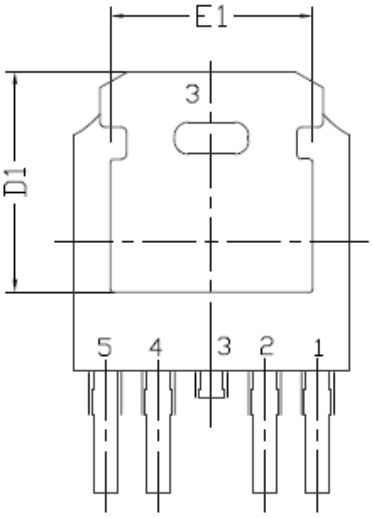


11. Normalized Thermal Transient Junction to Ambient

Package Information







SYMBOL	DIMENSIONAL REQMTS			INCHES REQMTS		
	MIN	NOM	MAX	MIN	NOM	MAX
E	6.35	6.60	6.73	0.250	0.260	0.265
L	1.40	1.52	1.77	0.055	0.060	0.070
L1	2.743 REF			0.108 REF		
L2	0.508 BSC			0.020 BSC		
L3	0.89	1.016	1.27	0.035	0.040	0.050
L4	0.64	--	1.01	0.025	--	0.040
D	6.00	6.10	6.20	0.236	0.240	0.244
H	9.40	10.00	10.40	0.370	0.394	0.409
b	0.508	0.56	0.711	0.020	0.022	0.028
b2	0.584	0.636	0.787	0.023	0.025	0.031
b3	5.21	5.34	5.46	0.205	0.210	0.215
e	1.27 BSC			0.050 BSC		
A	2.20	2.30	2.38	0.087	0.091	0.094
A1	0	--	0.127	0	--	0.005
c	0.457	0.50	0.60	0.018	0.020	0.024
c2	0.457	0.50	0.60	0.018	0.020	0.024
D1	5.21	--	--	0.205	--	--
E1	4.318	--	--	0.170	--	--
θ	0°	--	10°	0°	--	10°
θ1	0°	7°	15°	0°	7°	15°