

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

Key Features:

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

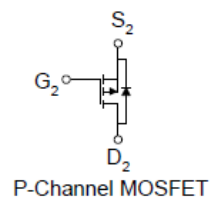
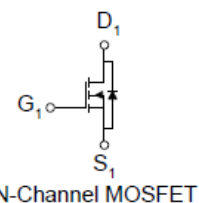
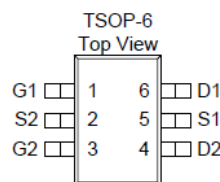
Typical Applications:

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

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (m Ω)	I_D (A)
60	153 @ $V_{GS} = 10V$	2.3
	185 @ $V_{GS} = 4.5V$	2.1
-60	310 @ $V_{GS} = -10V$	-1.6
	405 @ $V_{GS} = -4.5V$	-1.4



RoHS
COMPLIANT
HALOGEN
FREE



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ 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	$T_A = 25^\circ\text{C}$	I_D	2.3	-1.6	A
	$T_A = 70^\circ\text{C}$		1.9	-1.3	
Pulsed Drain Current ^b		I_{DM}	10	-10	
Continuous Source Current (Diode Conduction) ^a		I_S	2.5	-2.5	A
Power Dissipation ^a	$T_A = 25^\circ\text{C}$	P_D	1.15	1.15	W
	$T_A = 70^\circ\text{C}$		0.7	0.7	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150		$^\circ\text{C}$

THERMAL RESISTANCE RATINGS				
Parameter		Symbol	Maximum	Units
Maximum Junction-to-Ambient ^a	$t \leq 10$ sec	$R_{\theta JA}$	110	$^\circ\text{C/W}$
	Steady State		150	

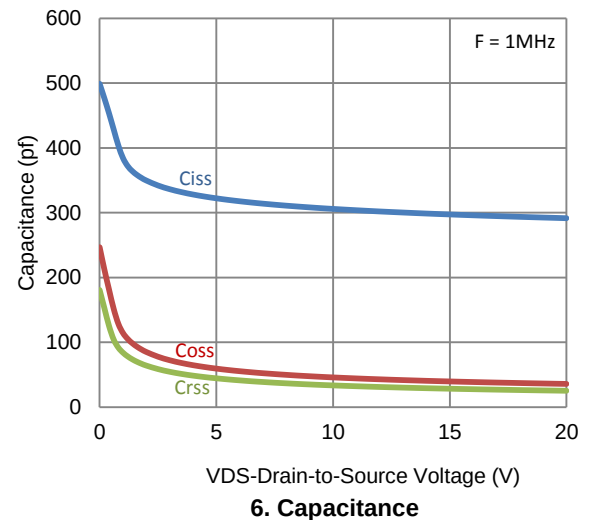
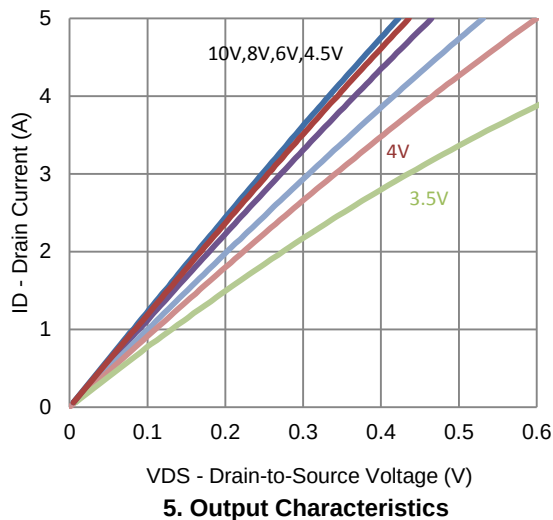
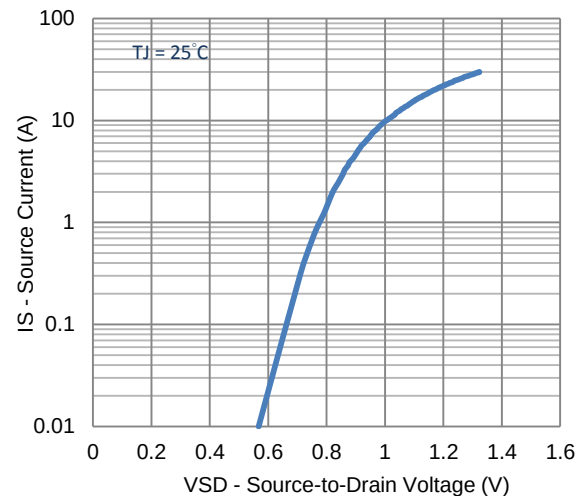
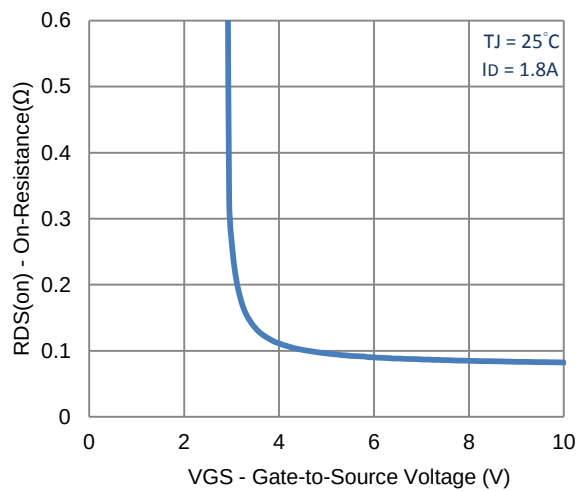
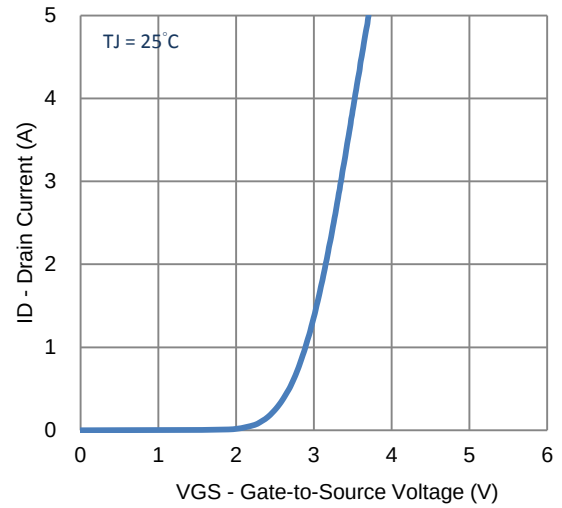
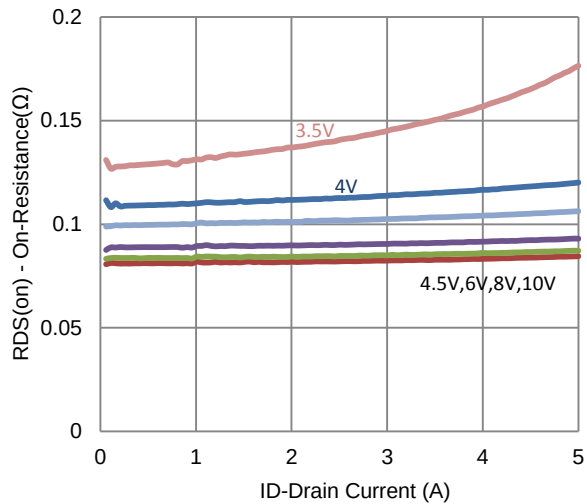
Notes

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

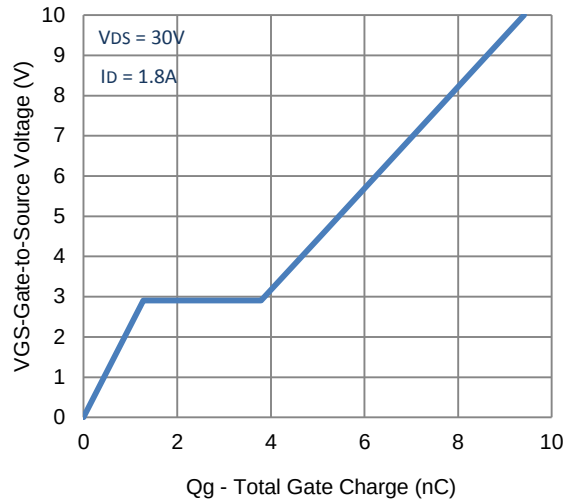
Electrical Characteristics

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} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V (N-ch)			1	uA
		V _{DS} = -20 V, V _{GS} = 0 V (P-ch)			-1	
On-State Drain Current	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V (N-ch)	4			A
		V _{DS} = -5 V, V _{GS} = -10 V (P-ch)	-4			A
Drain-Source On-Resistance	r _{DS(on)}	V _{GS} = 10 V, I _D = 1.8 A (N-ch)			153	mΩ
		V _{GS} = 4.5 V, I _D = 1.5 A (N-ch)			185	
		V _{GS} = -10 V, I _D = -1.2 A (P-ch)			310	mΩ
		V _{GS} = -4.5 V, I _D = -1 A (P-ch)			405	
Forward Transconductance	g _{fs}	V _{DS} = 15 V, I _D = 1.8 A (N-ch)		15		S
		V _{DS} = -15 V, I _D = -1.2 A (P-ch)		20		S
Diode Forward Voltage	V _{SD}	I _S = 1.2 A, V _{GS} = 0 V (N-ch)		0.78		V
		I _S = -1.2 A, V _{GS} = 0 V (P-ch)		-0.82		V
Dynamic						
Total Gate Charge	Q _g	N - Channel V _{DS} = 30 V, V _{GS} = 4.5 V, I _D = 1.8 A		4.9		nC
Gate-Source Charge	Q _{gs}			1.3		
Gate-Drain Charge	Q _{gd}			2.5		
Turn-On Delay Time	t _{d(on)}	N - Channel V _{DD} = 30 V, R _L = 16.6 Ω, I _D = 1.8 A, V _{GEN} = 10 V, R _{GEN} = 6 Ω		4		ns
Rise Time	t _r			5		
Turn-Off Delay Time	t _{d(off)}			16		
Fall Time	t _f			4		
Input Capacitance	C _{iss}	N - Channel V _{DS} = 15 V, V _{GS} = 0 V, f = 1 MHz		297		pF
Output Capacitance	C _{oss}			40		
Reverse Transfer Capacitance	C _{rss}			28		
Total Gate Charge	Q _g	P - Channel V _{DS} = -30 V, V _{GS} = 4.5 V, I _D = -1.2 A		4.9		nC
Gate-Source Charge	Q _{gs}			1.5		
Gate-Drain Charge	Q _{gd}			2.2		
Turn-On Delay Time	t _{d(on)}	P - Channel V _{DD} = -30 V, R _L = 25 Ω, I _D = -1.2 A, V _{GEN} = -10 V, R _{GEN} = 6 Ω		6		ns
Rise Time	t _r			5		
Turn-Off Delay Time	t _{d(off)}			19		
Fall Time	t _f			7		
Input Capacitance	C _{iss}	P - Channel V _{DS} = -15 V, V _{GS} = 0 V, f = 1 MHz		385		pF
Output Capacitance	C _{oss}			40		
Reverse Transfer Capacitance	C _{rss}			28		

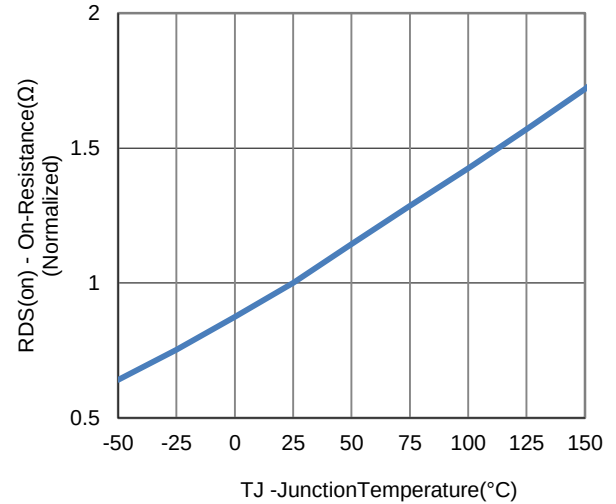
Typical Electrical Characteristics - N-channel



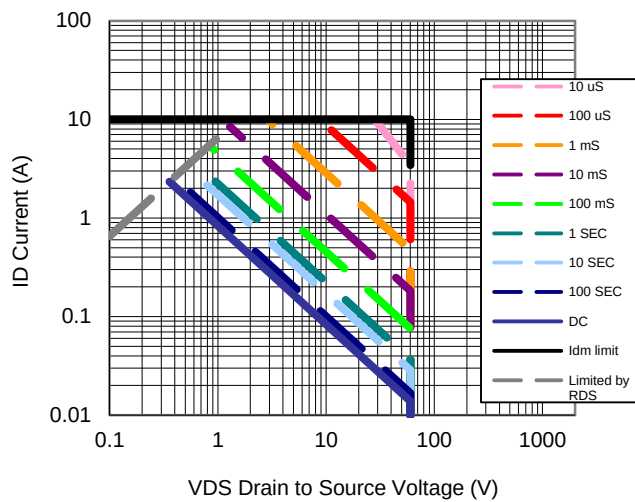
Typical Electrical Characteristics - N-channel



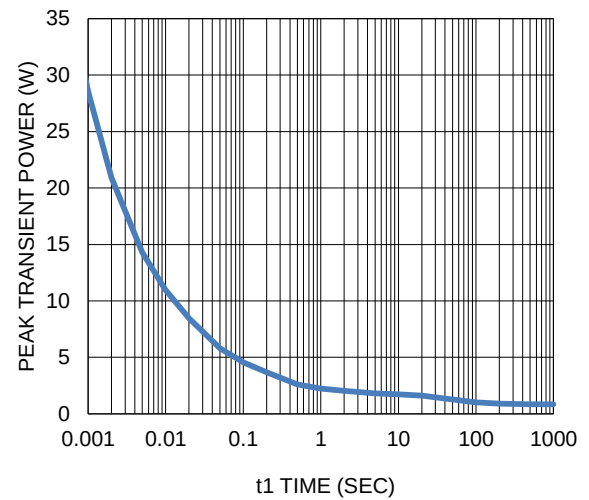
7. Gate Charge



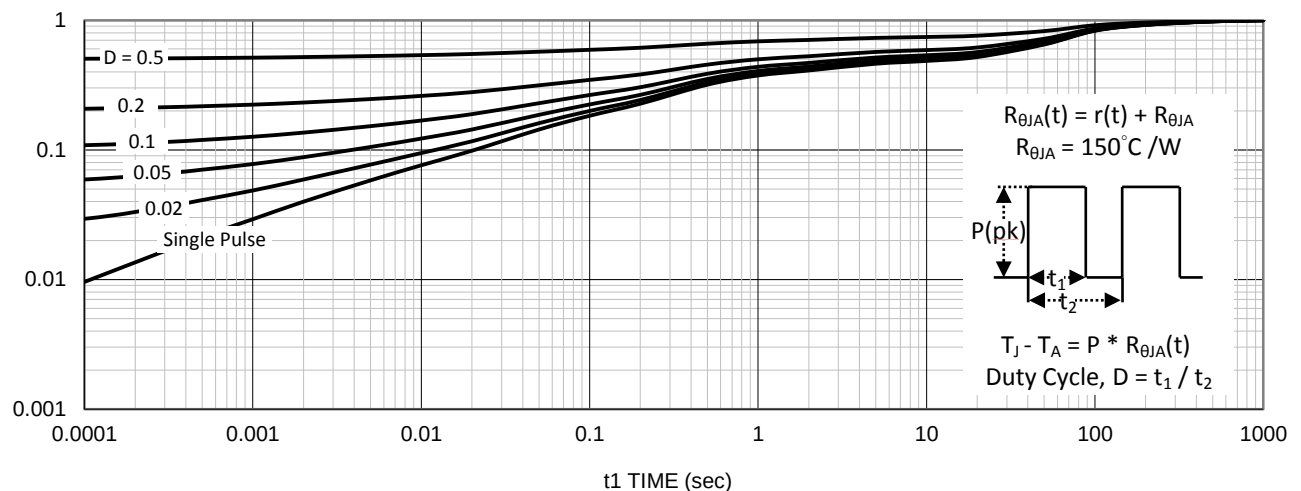
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

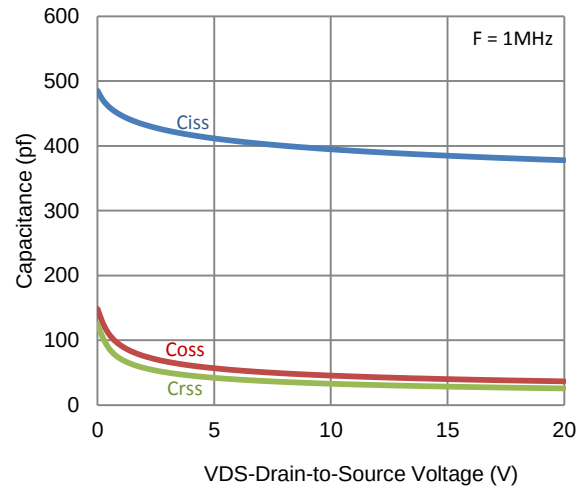
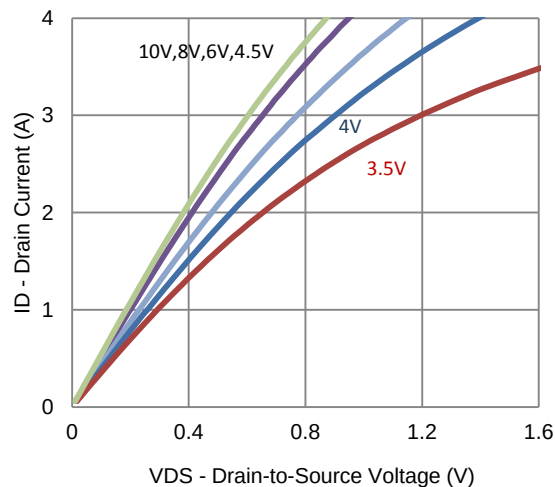
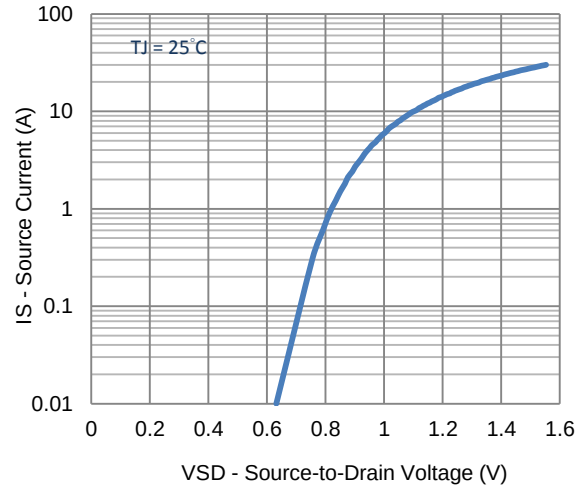
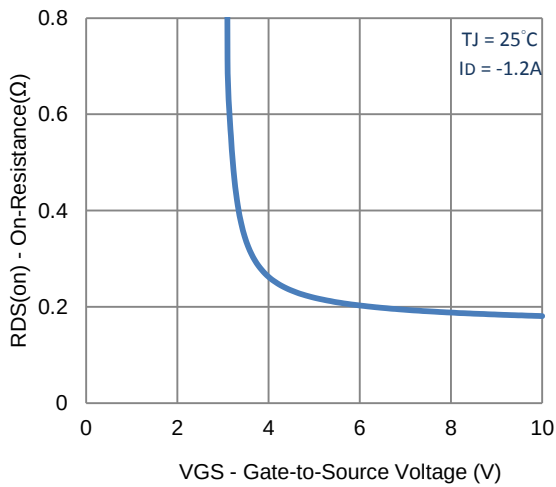
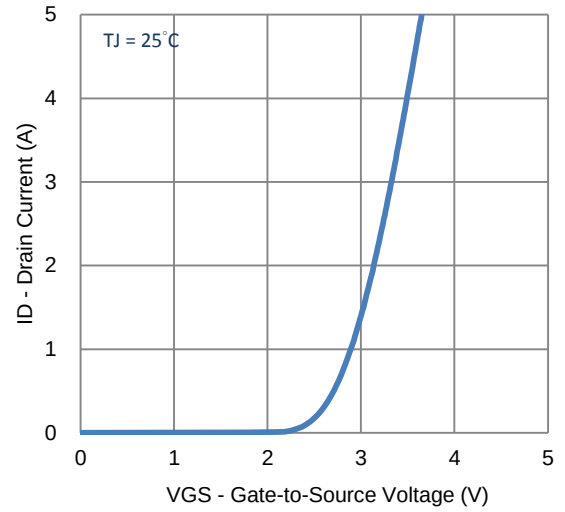
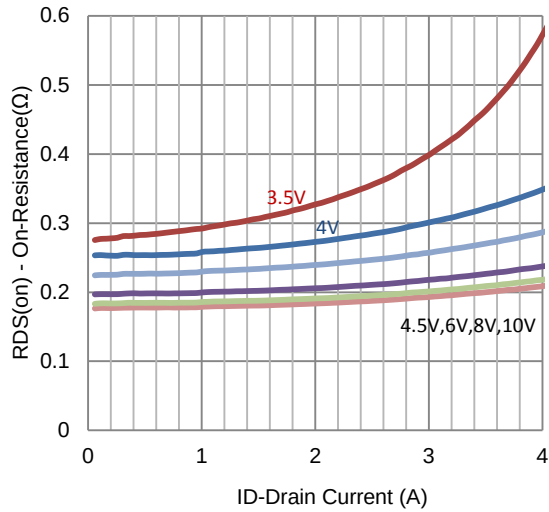


10. Single Pulse Maximum Power Dissipation

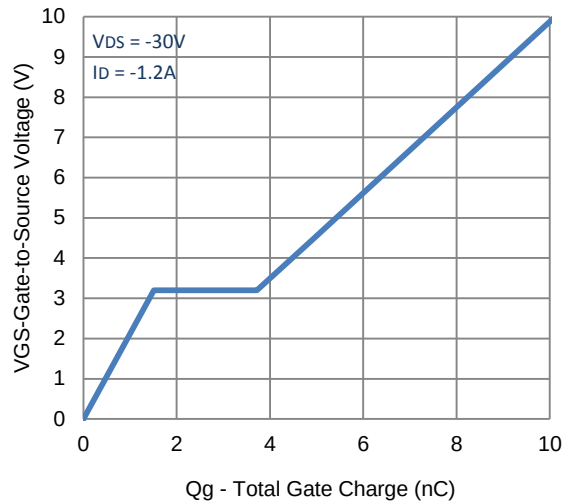


11. Normalized Thermal Transient Junction to Ambient

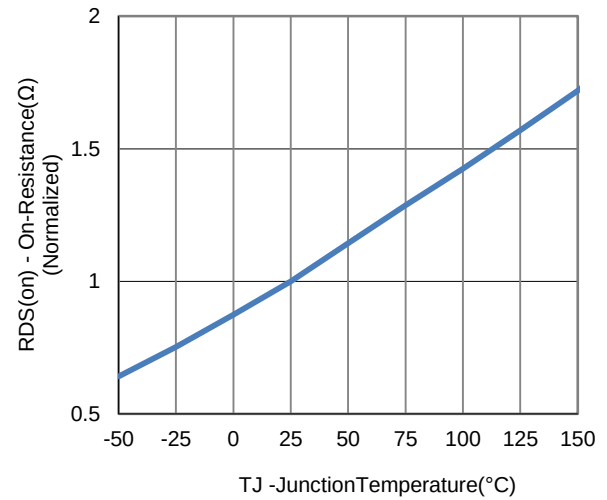
Typical Electrical Characteristics - P-channel



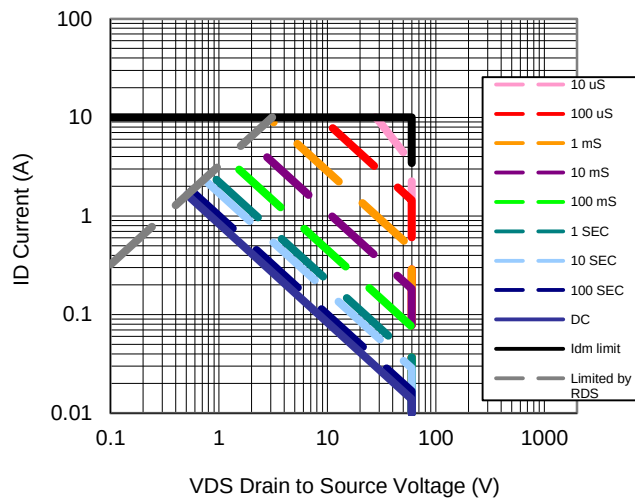
Typical Electrical Characteristics - P-channel



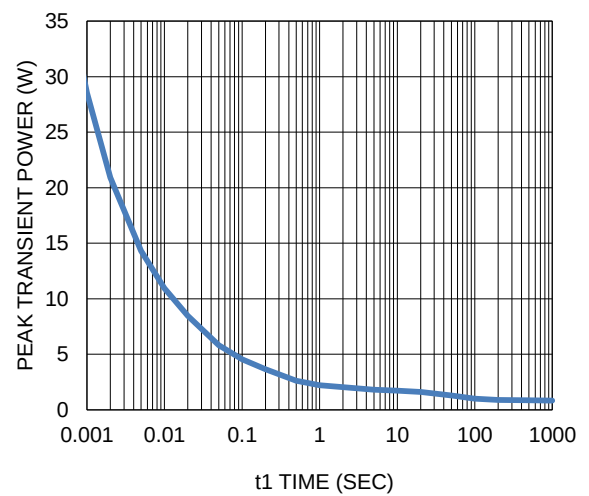
7. Gate Charge



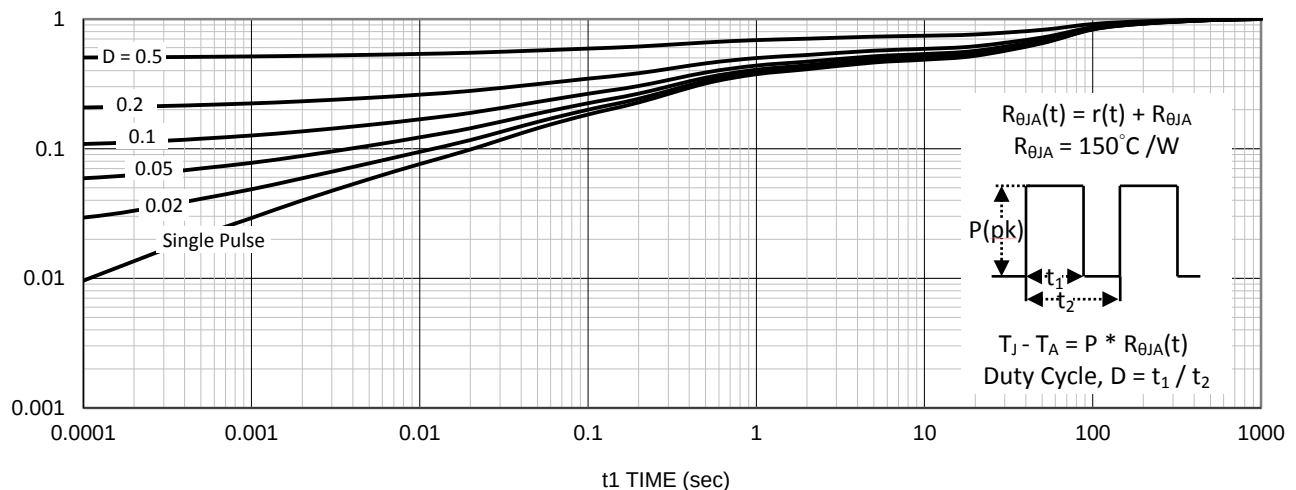
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

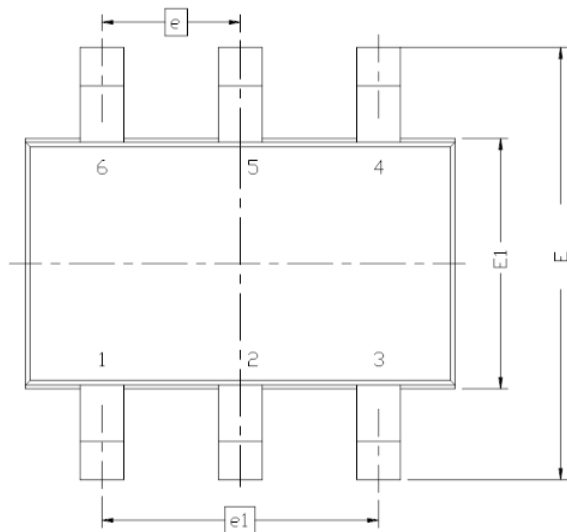


10. Single Pulse Maximum Power Dissipation

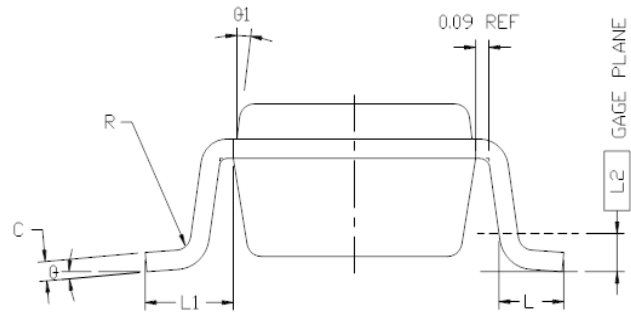
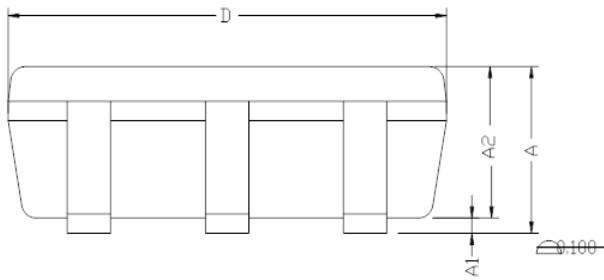


11. Normalized Thermal Transient Junction to Ambient

Package Information



DIM.	MILLIMETERS		
	MIN	NOM	MAX
A	0.935	---	1.10
A1	0.01	---	0.10
A2	0.70	---	1.00
b	0.25	0.32	0.40
c	0.10	0.15	0.20
D	2.95	3.05	3.10
E	2.70	2.85	2.98
E1	1.55	1.65	1.70
e	0.95 BSC		
L	0.30	---	0.60
L1	0.60REF		
L2	0.25BSC		
R	0.10	---	---
θ	0°	4°	8°
θ1	7° NOM		



Note:

1. All Dimension Are In mm.
2. Package Body Sizes Exclude Mold Flash, Protrusion Or Gate Burrs. Mold Flash, Protrusion Or Gate Burrs Shall Not Exceed 0.10 mm Per Side.
3. Package Body Sizes Determined At The Outermost Extremes Of The Plastic Body Exclusive Of Mold Flash, Tie Bar Burrs, Gate Burrs And Interlead Flash, But Including Any Mismatch Between The Top And Bottom Of The Plastic Body.
4. The Package Top May Be Smaller Than The Package Bottom.
5. Dimension "B" Does Not Include Dambar Protrusion. Allowable Dambar Protrusion Shall Be 0.08 mm Total In Excess Of "B" Dimension At Maximum Material Condition. The Dambar Cannot Be Located On The Lower Radius Of The Foot.