

## P-Channel 60-V (D-S) MOSFET

### Key Features:

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

### Typical Applications:

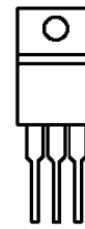
- White LED boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits

PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ (m $\Omega$ )	$I_D$ (A)
-60	20 @ $V_{GS} = -10V$	-90 <sup>a</sup>
	28 @ $V_{GS} = -4.5V$	



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

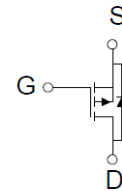
TO-220AB



G D S

Top View

DRAIN  
connected  
to TAB



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ C$ UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Units
Drain-Source Voltage		$V_{DS}$	-60	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	
Continuous Drain Current <sup>a</sup>	$T_C = 25^\circ C$	$I_D$	-90	A
Pulsed Drain Current <sup>b</sup>		$I_{DM}$	-360	
Continuous Source Current (Diode Conduction) <sup>a</sup>	$T_C = 25^\circ C$	$I_S$	-90	A
Power Dissipation <sup>a</sup>	$T_C = 25^\circ C$	$P_D$	300	W
Operating Junction and Storage Temperature Range		$T_J, T_{stg}$	-55 to 175	$^\circ C$

THERMAL RESISTANCE RATINGS			
Parameter	Symbol	Maximum	Units
Maximum Junction-to-Ambient <sup>c</sup>	$R_{\theta JA}$	62.5	$^\circ C/W$
Maximum Junction-to-Case	$R_{\theta JC}$	0.5	

### Notes

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

## Electrical Characteristics

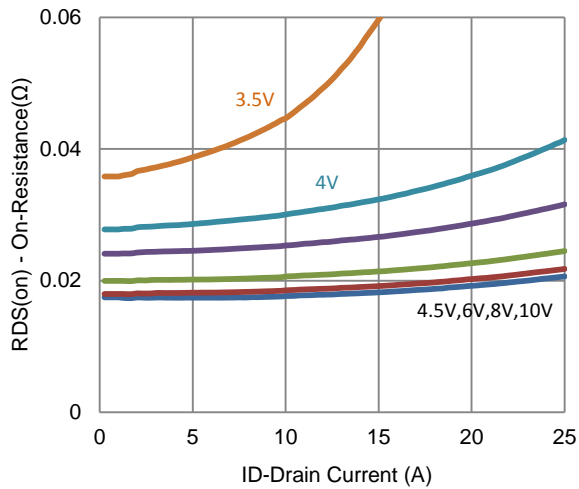
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250 \mu A$	-1			V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -48 V, V_{GS} = 0 V$			-1	uA
		$V_{DS} = -48 V, V_{GS} = 0 V, T_J = 55^\circ C$			-10	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} = -5 V, V_{GS} = -10 V$	-110			A
Drain-Source On-Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = -10 V, I_D = -20 A$			20	mΩ
		$V_{GS} = -4.5 V, I_D = -16 A$			28	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -15 V, I_D = -20 A$		10		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = -45 A, V_{GS} = 0 V$		0.75		V
<b>Dynamic <sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = -30 V, V_{GS} = -4.5 V,$ $I_D = -20 A$		22		nC
Gate-Source Charge	$Q_{gs}$			10		
Gate-Drain Charge	$Q_{gd}$			9.3		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = -30 V, R_L = 1.5 \Omega,$ $I_D = -20 A,$ $V_{GEN} = -10 V, R_{GEN} = 6 \Omega$		9		ns
Rise Time	$t_r$			9		
Turn-Off Delay Time	$t_{d(off)}$			85		
Fall Time	$t_f$			27		
Input Capacitance	$C_{iss}$	$V_{DS} = -15 V, V_{GS} = 0 V, f = 1 Mhz$		4464		pF
Output Capacitance	$C_{oss}$			216		
Reverse Transfer Capacitance	$C_{rss}$			163		

## Notes

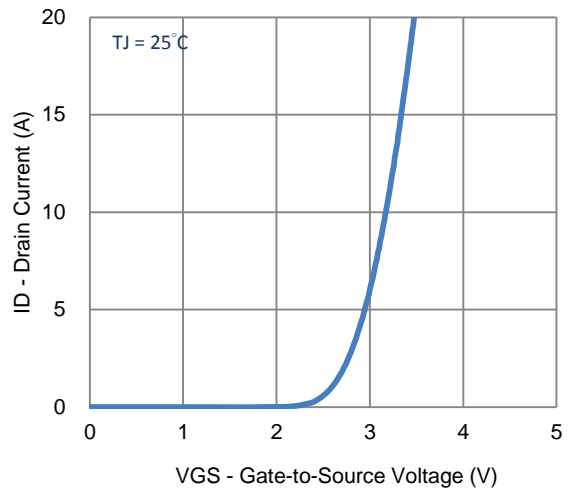
- Pulse test:  $PW \leq 300 \mu s$  duty cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.

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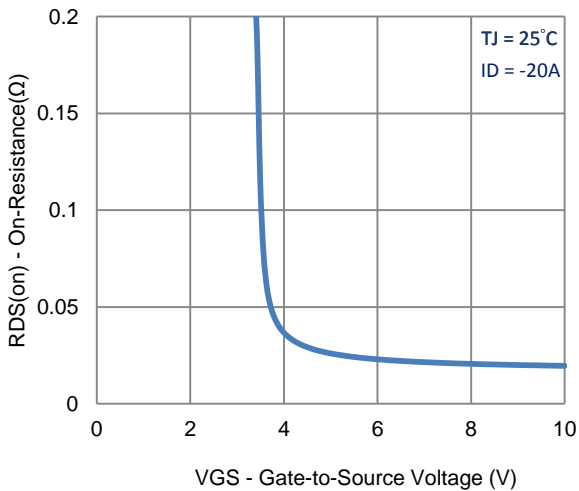
Typical Electrical Characteristics



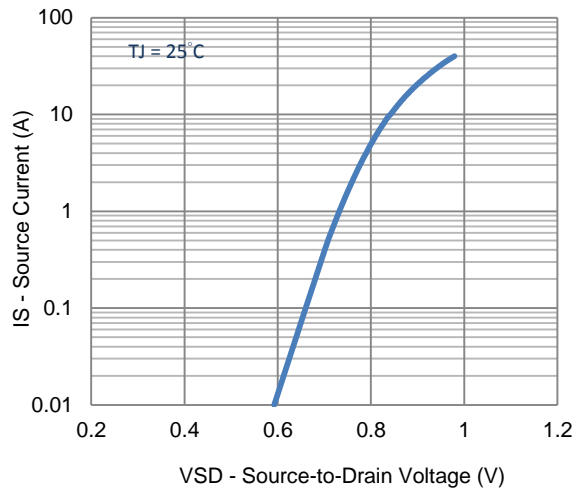
1. On-Resistance vs. Drain Current



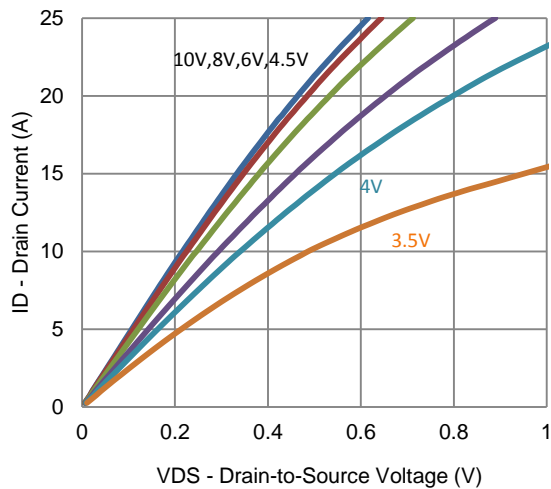
2. Transfer Characteristics



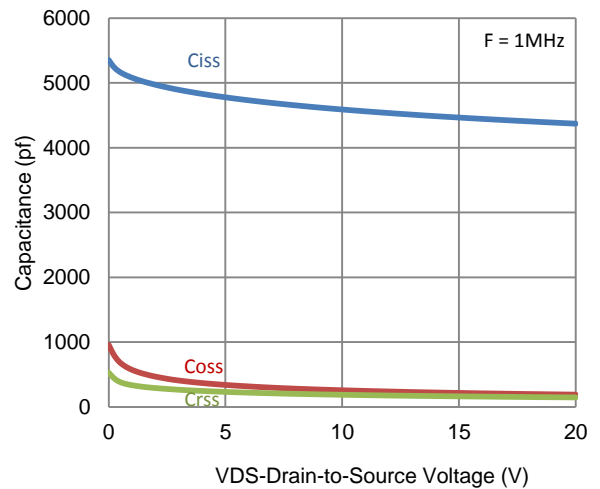
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

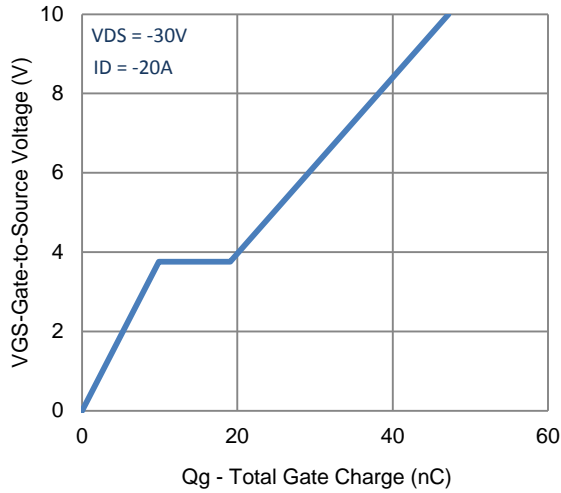


5. Output Characteristics

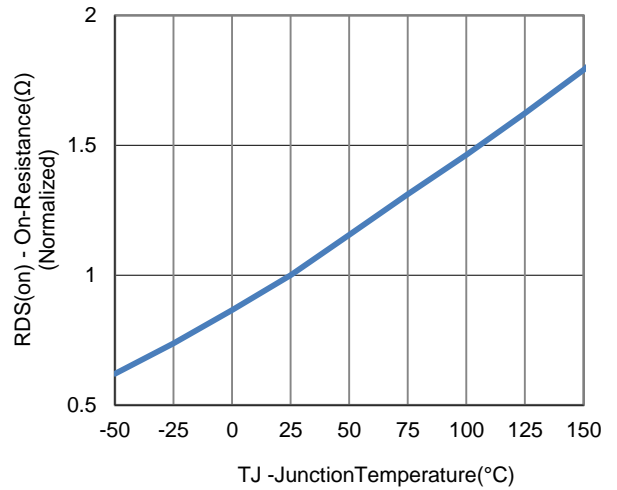


6. Capacitance

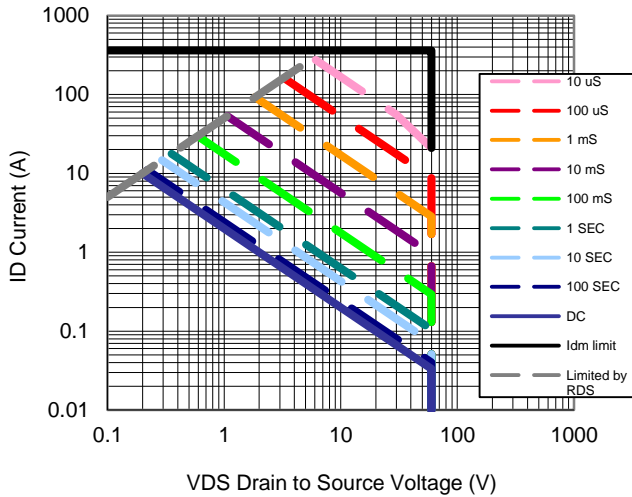
Typical Electrical Characteristics



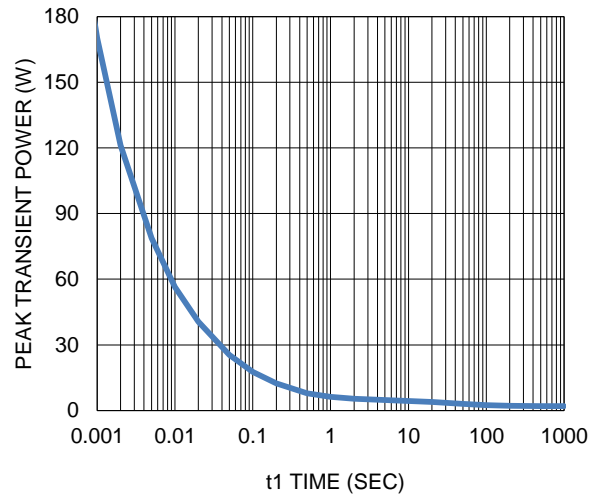
7. Gate Charge



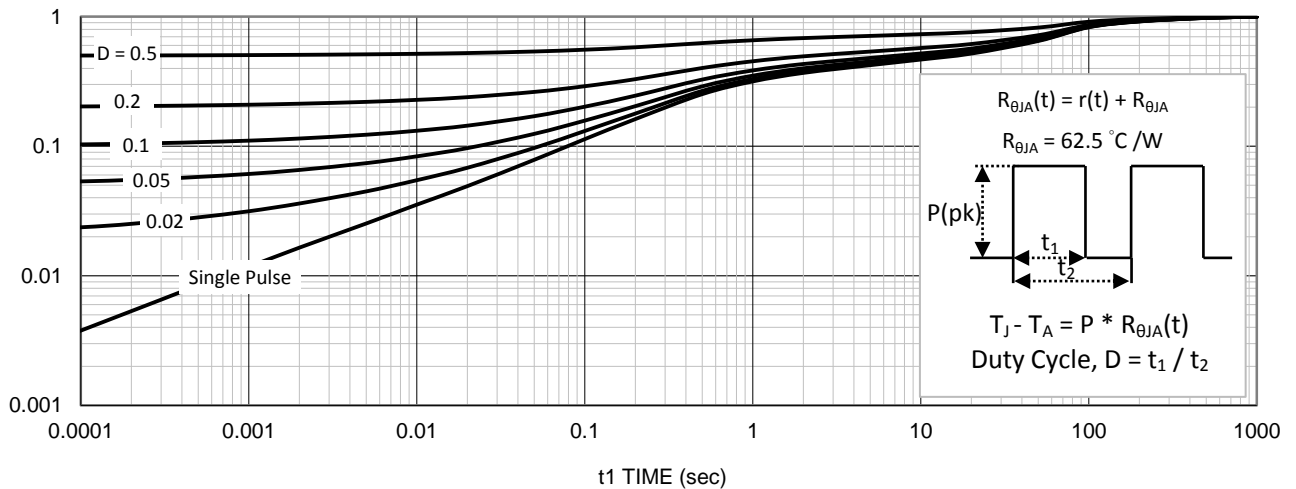
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

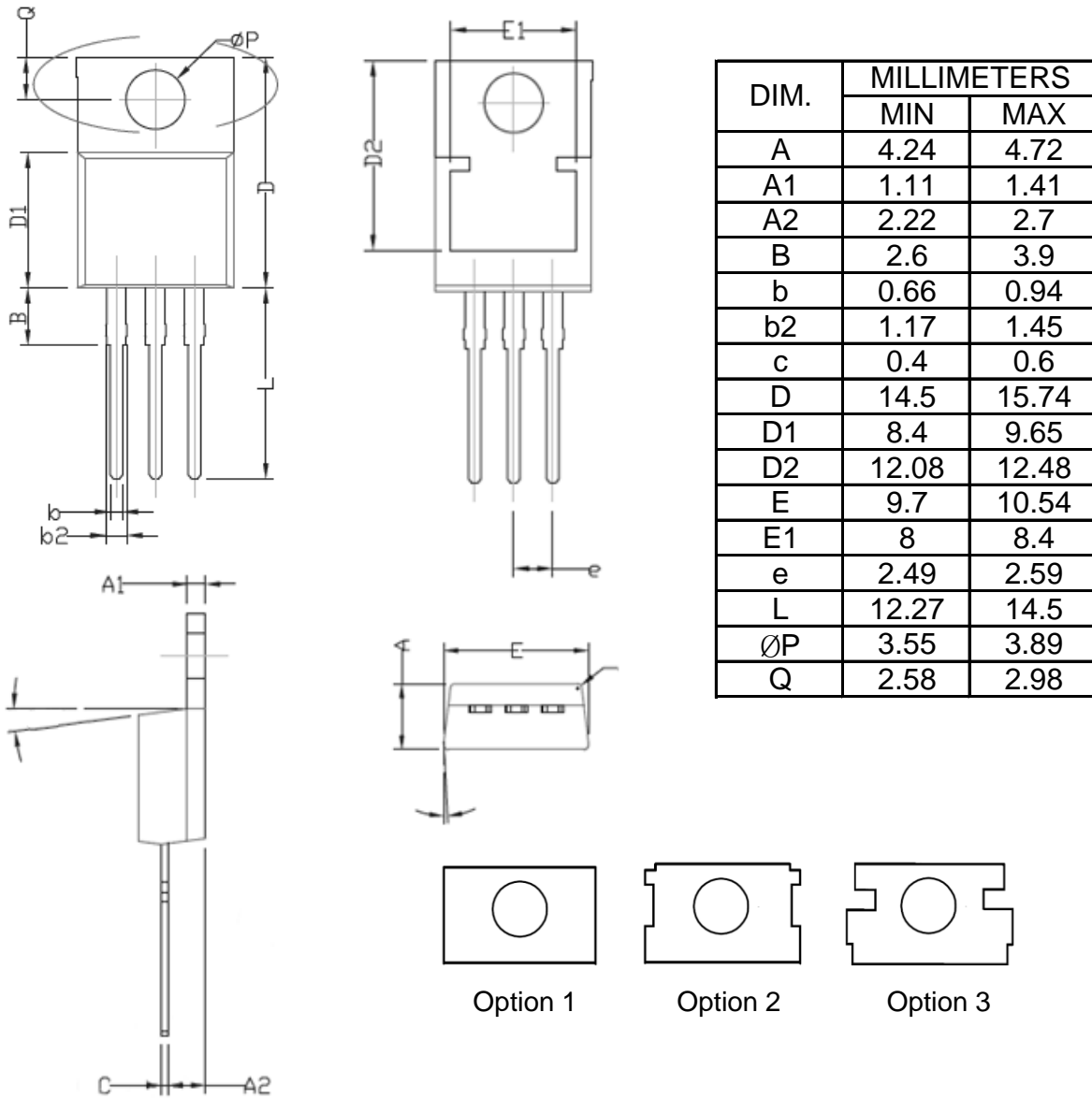


10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information



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