

## N-Channel 40-V (D-S) MOSFET

### Key Features:

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

### Typical Applications:

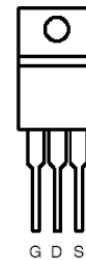
- White LED boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits

PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ (m $\Omega$ )	$I_D$ (A)
40	5 @ $V_{GS} = 10V$	90 <sup>a</sup>
	7.5 @ $V_{GS} = 5.5V$	

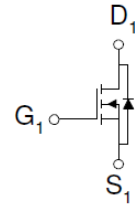


**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

TO-220AB



DRAIN  
connected  
to TAB



N-Channel MOSFET

Top View

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Units
Drain-Source Voltage		$V_{DS}$	40	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	
Continuous Drain Current <sup>a</sup>	$T_C = 25^\circ\text{C}$	$I_D$	90	A
Pulsed Drain Current <sup>b</sup>		$I_{DM}$	360	
Continuous Source Current (Diode Conduction) <sup>a</sup>		$I_S$	90	A
Power Dissipation <sup>a</sup>	$T_C = 25^\circ\text{C}$	$P_D$	300	W
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 <sup>a</sup>	$R_{\theta JA}$	62.5	$^\circ\text{C}/\text{W}$
Maximum Junction-to-Case	$R_{\theta JC}$	1	

Notes

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

## Electrical Characteristics

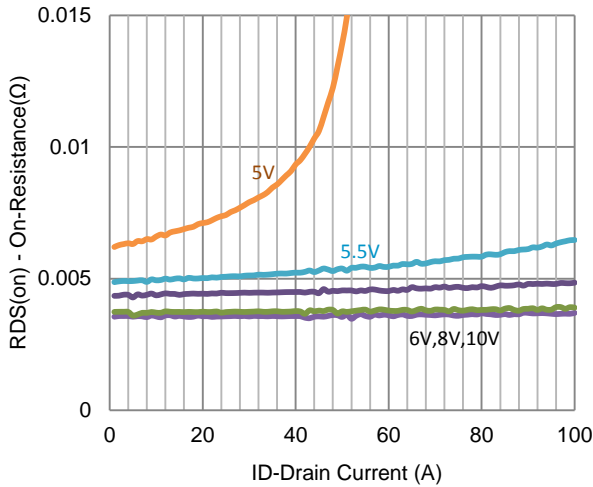
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu A$	1			V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 32 V, V_{GS} = 0 V$			1	uA
		$V_{DS} = 32 V, V_{GS} = 0 V, T_J = 55^\circ C$			25	
On-State Drain Current	$I_{D(on)}$	$V_{DS} = 5 V, V_{GS} = 10 V$	120			A
Drain-Source On-Resistance	$r_{DS(on)}$	$V_{GS} = 10 V, I_D = 45 A$			5	m $\Omega$
		$V_{GS} = 5.5 V, I_D = 40 A$			7.5	
Forward Transconductance	$g_{fs}$	$V_{DS} = 15 V, I_D = 20 A$		30		S
Diode Forward Voltage	$V_{SD}$	$I_S = 55 A, V_{GS} = 0 V$		0.89		V
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS} = 20 V, V_{GS} = 5.5 V,$ $I_D = 20 A$		69		nC
Gate-Source Charge	$Q_{gs}$			31		
Gate-Drain Charge	$Q_{gd}$			31		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 20 V, R_L = 1 \Omega,$ $I_D = 20 A,$ $V_{GEN} = 10 V, R_{GEN} = 6 \Omega$		37		ns
Rise Time	$t_r$			45		
Turn-Off Delay Time	$t_{d(off)}$			112		
Fall Time	$t_f$			39		
Input Capacitance	$C_{iss}$	$V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz$		9569		pF
Output Capacitance	$C_{oss}$			768		
Reverse Transfer Capacitance	$C_{rss}$			548		

## Notes

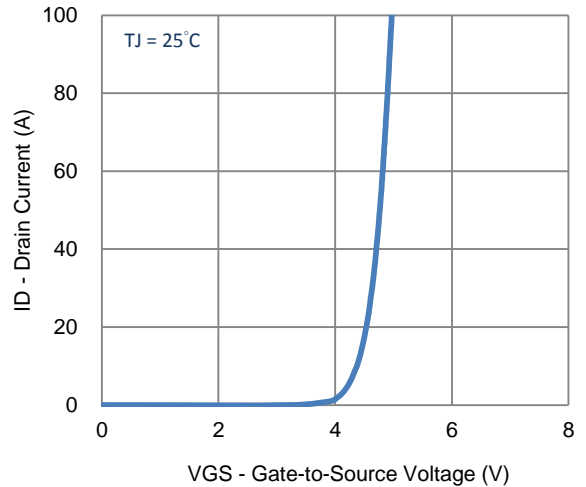
- Pulse test: PW  $\leq$  300us duty cycle  $\leq$  2%.
- Guaranteed by design, not subject to production testing.

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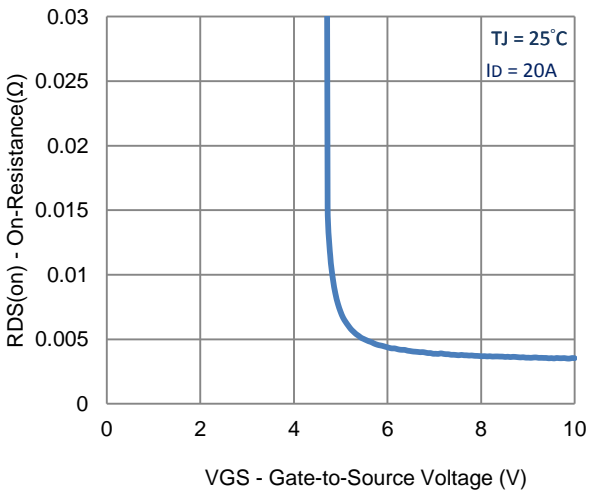
Typical Electrical Characteristics



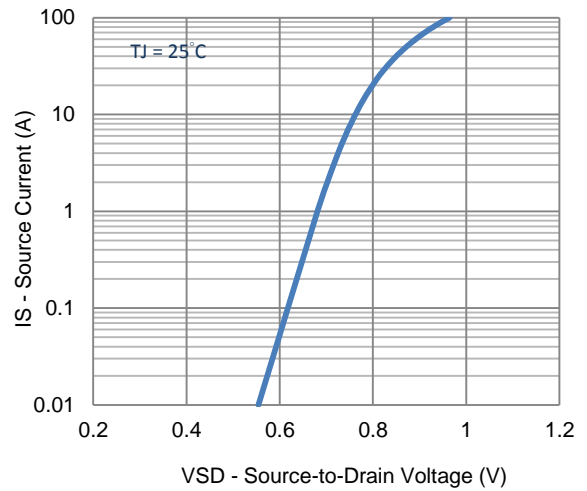
1. On-Resistance vs. Drain Current



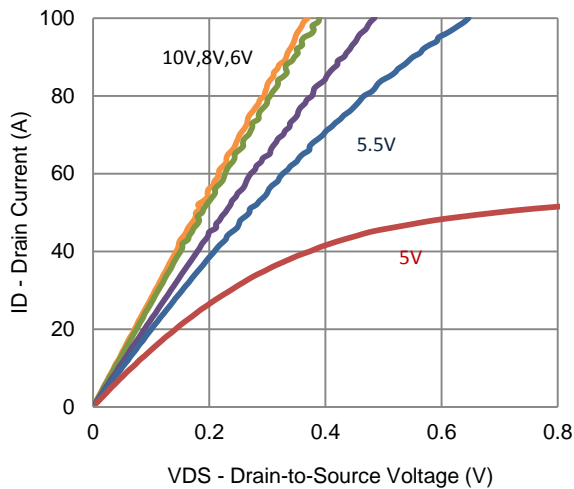
2. Transfer Characteristics



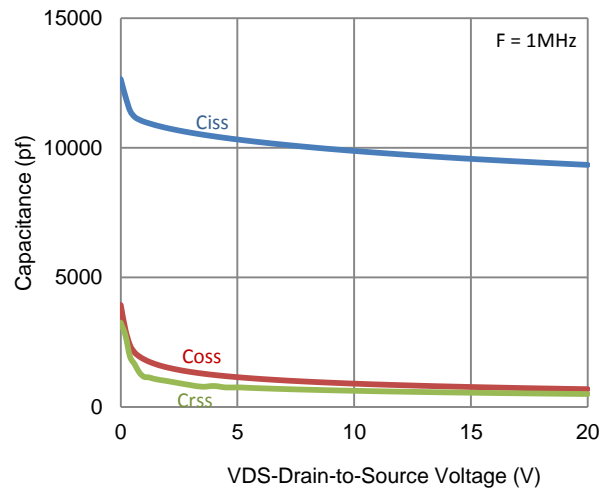
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

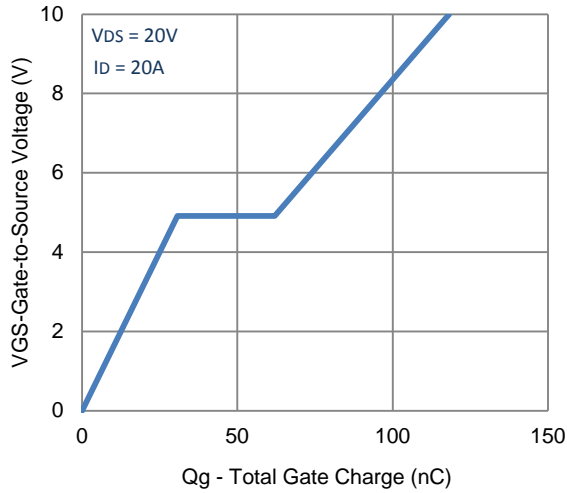


5. Output Characteristics

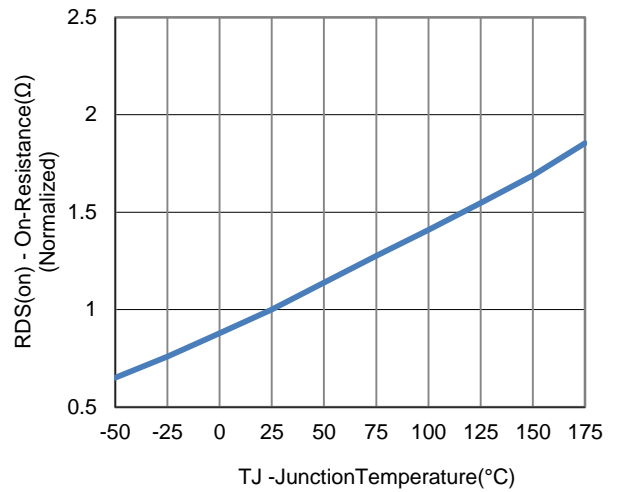


6. Capacitance

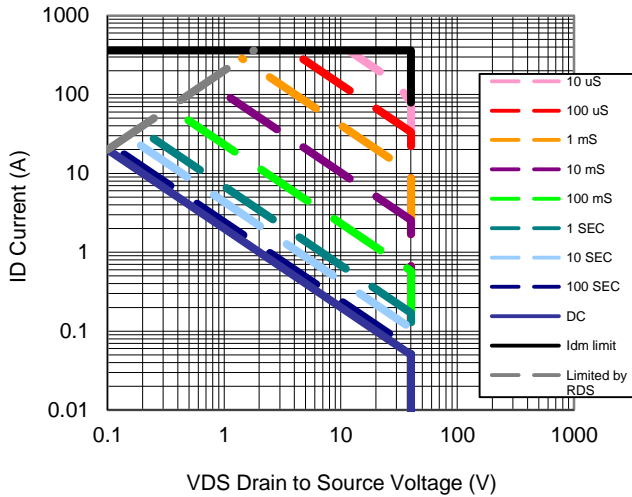
Typical Electrical Characteristics



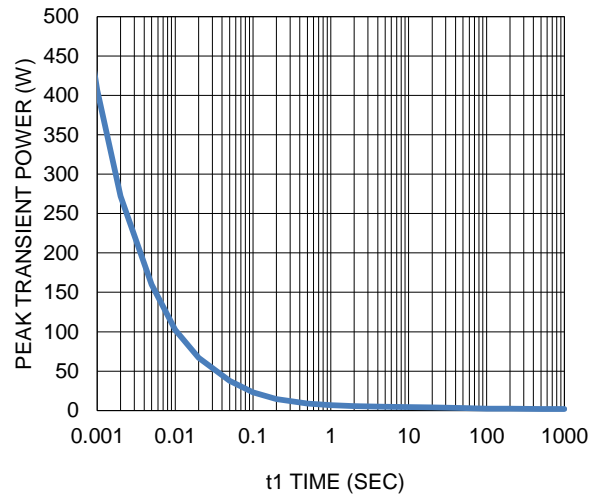
7. Gate Charge



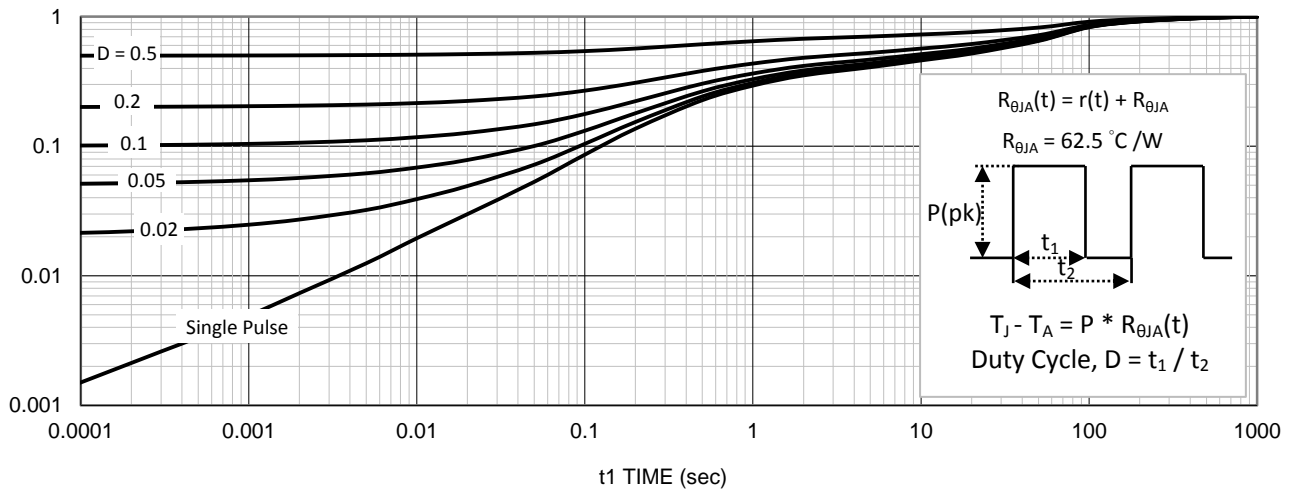
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area



10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information

