

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

Key Features:

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

Typical Applications:

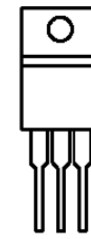
- Automotive Systems
- DC/DC Conversion Circuits
- Battery Powered Power Tools

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (m Ω)	I_D (A)
40	2.3 @ $V_{GS} = 10V$	232 ^a
	3 @ $V_{GS} = 4.5V$	



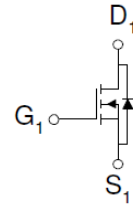
RoHS
COMPLIANT
HALOGEN
FREE

TO-220AB



Top View

DRAIN
connected
to TAB



N-Channel MOSFET

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}	± 20	
Continuous Drain Current ^a	$T_C = 25^\circ\text{C}$	I_D	232	A
Pulsed Drain Current ^b		I_{DM}	928	
Continuous Source Current (Diode Conduction) ^a	$T_C = 25^\circ\text{C}$	I_S	232	A
Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	300	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 175	$^\circ\text{C}$

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

Notes

- Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 170A
- Pulse width limited by maximum junction temperature
- Surface Mounted on 1" x 1" FR4 Board.

Electrical Characteristics

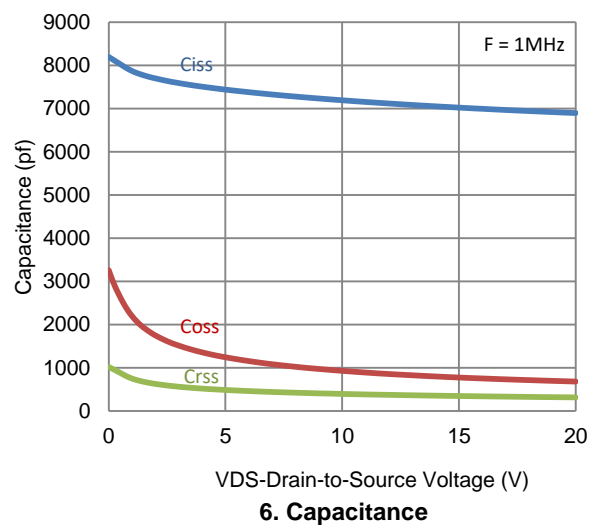
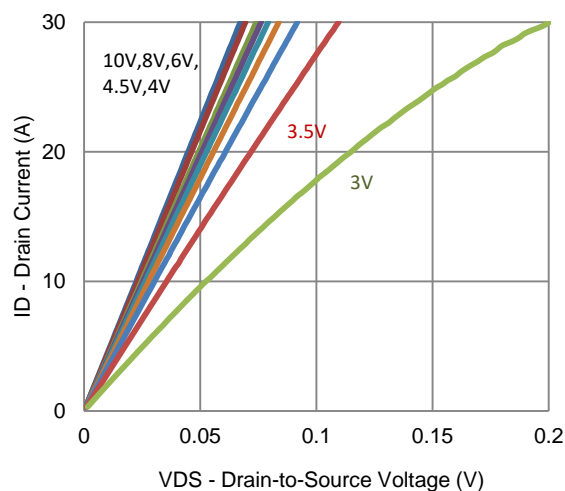
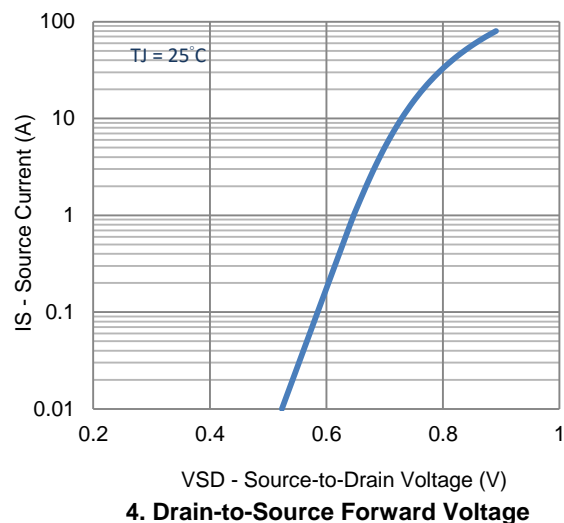
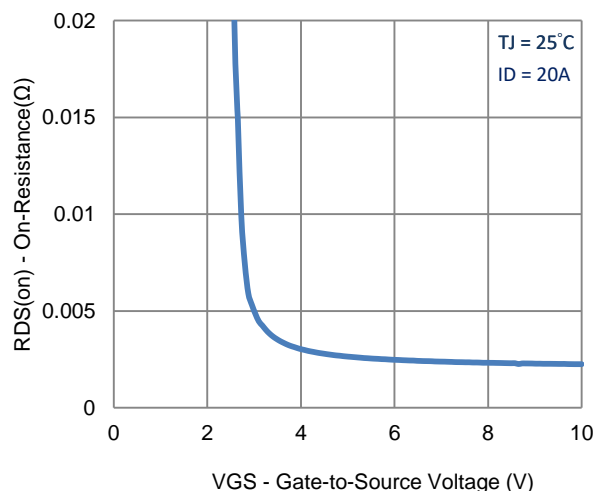
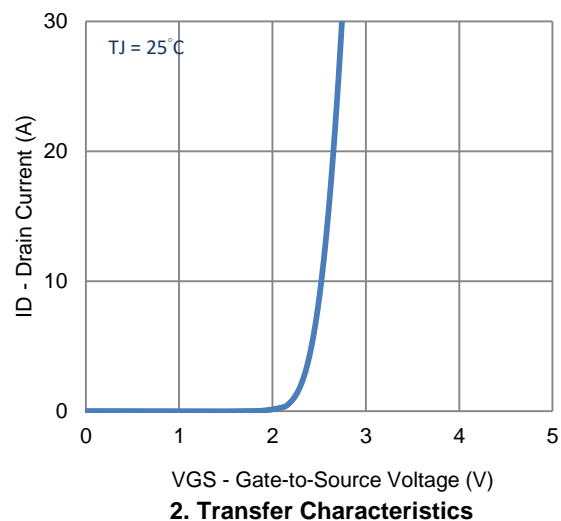
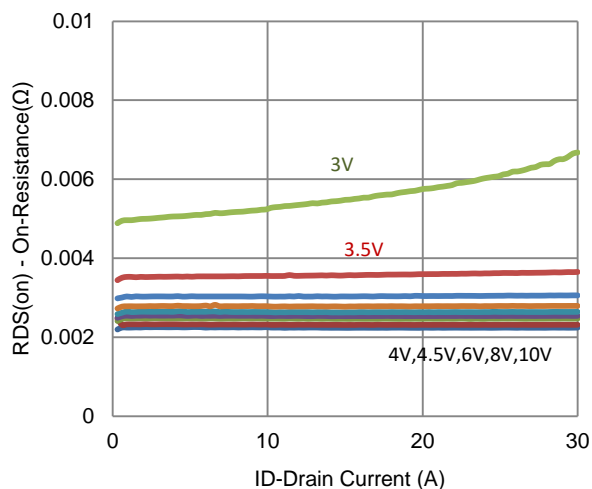
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu A$	1			V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 32 V, V_{GS} = 0 V$			1	μA
		$V_{DS} = 32 V, V_{GS} = 0 V, T_J = 55^\circ C$			10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = 5 V, V_{GS} = 10 V$	120			A
Drain-Source On-Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10 V, I_D = 45 A$			2.3	m Ω
		$V_{GS} = 4.5 V, I_D = 40 A$			3	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15 V, I_D = 45 A$		117		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 45 A, V_{GS} = 0 V$		0.83		V
Dynamic ^b						
Total Gate Charge	Q_g	$V_{DS} = 20 V, V_{GS} = 4.5 V,$ $I_D = 20 A$		65		nC
Gate-Source Charge	Q_{gs}			17		
Gate-Drain Charge	Q_{gd}			21		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 20 V, R_L = 1 \Omega,$ $I_D = 20 A,$ $V_{GEN} = 10 V, R_{GEN} = 6 \Omega$		18		ns
Rise Time	t_r			26		
Turn-Off Delay Time	$t_{d(off)}$			193		
Fall Time	t_f			73		
Input Capacitance	C_{iss}	$V_{DS} = 15 V, V_{GS} = 0 V, f = 1 \text{ Mhz}$		7019		pF
Output Capacitance	C_{oss}			772		
Reverse Transfer Capacitance	C_{rss}			344		

Notes

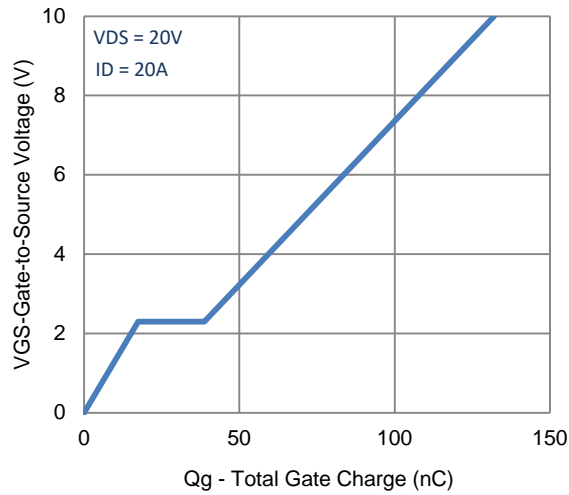
- a. Pulse test: PW ≤ 300us duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

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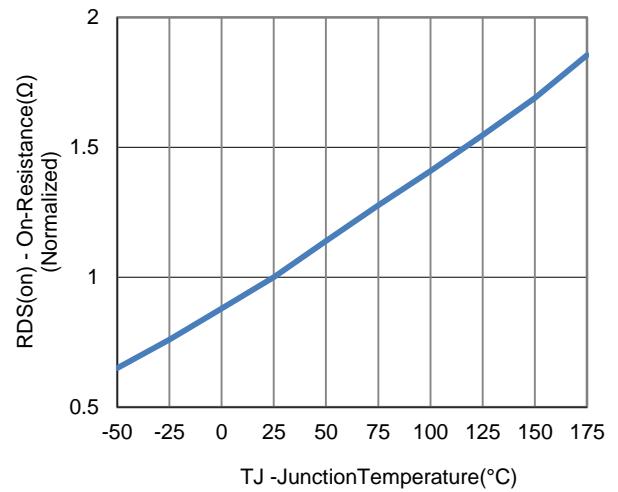
Typical Electrical Characteristics



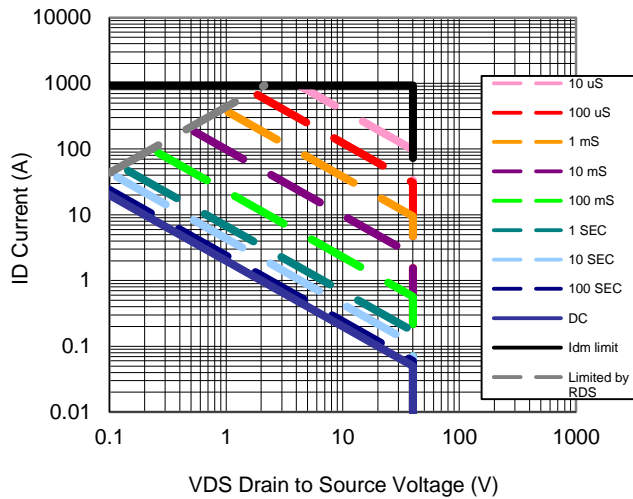
Typical Electrical Characteristics



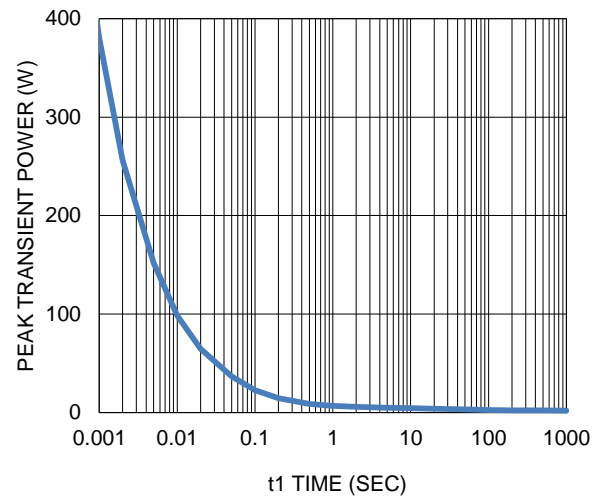
7. Gate Charge



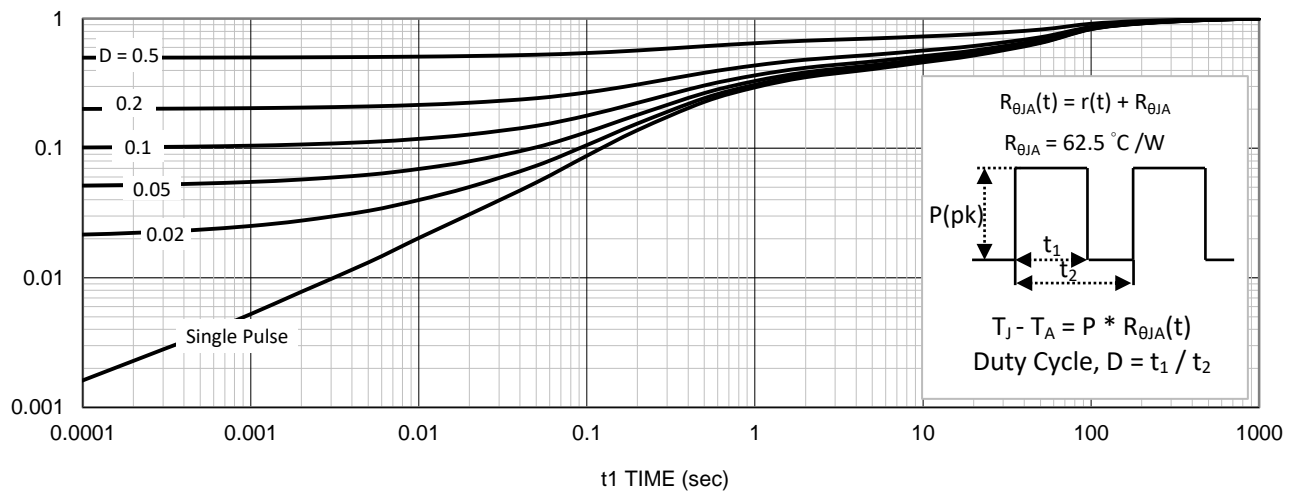
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

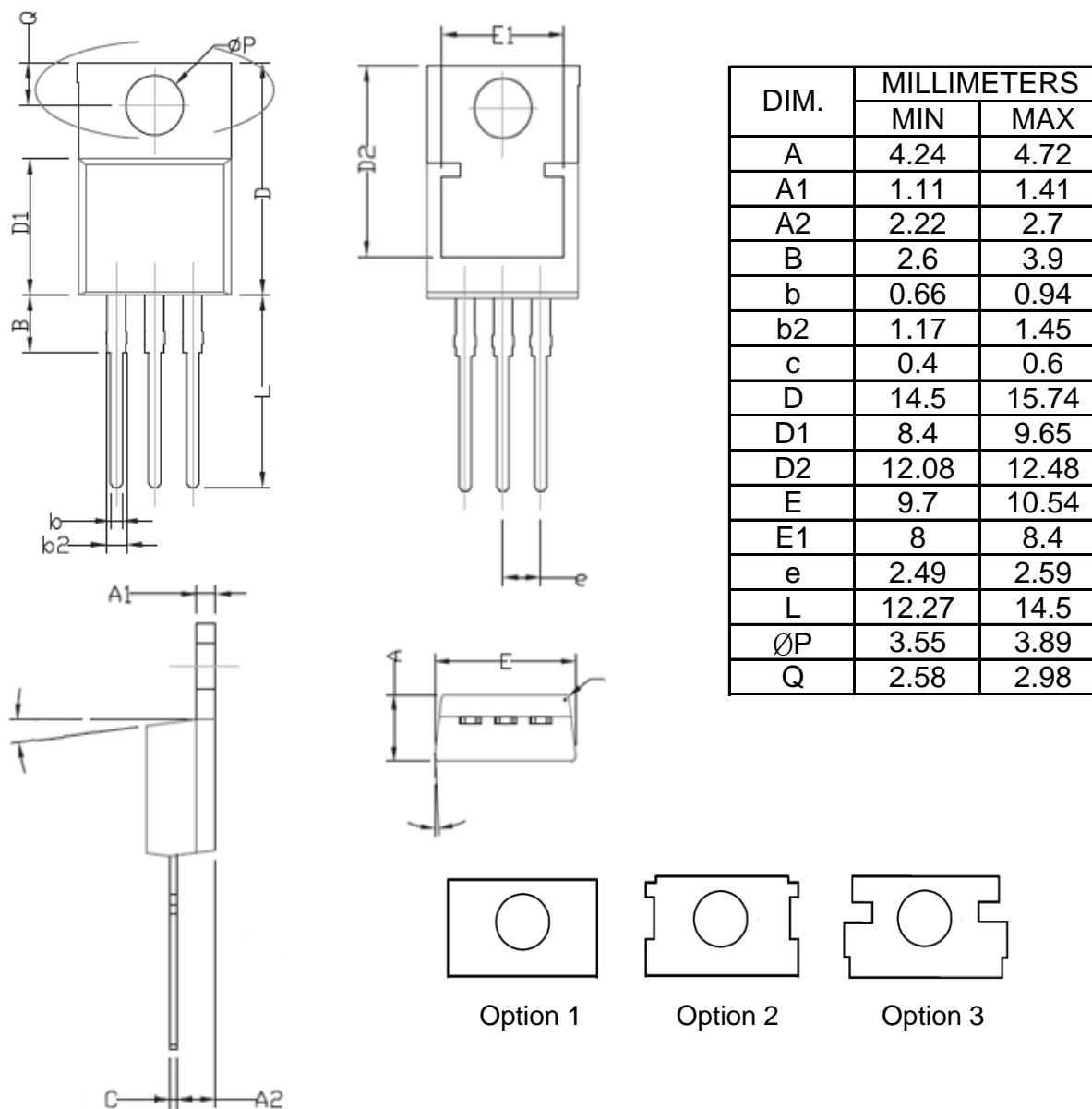


10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information



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