

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

Key Features:

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

Typical Applications:

- Cordless power tools
- Automotive Systems
- Industrial DC/DC Conversion Circuits

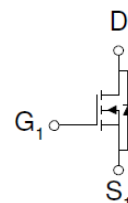


TO-220AB



G D S

Top View

DRAIN
connected
to TAB

N-Channel MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (m Ω)	I_D (A)
40	4 @ $V_{GS} = 10V$	202 ^a
	6 @ $V_{GS} = 5.5V$	

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	Limit	Units
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ^a	I_D	202	A
Pulsed Drain Current ^b	I_{DM}	808	
Continuous Source Current (Diode Conduction) ^a	I_S	202	A
Power Dissipation	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 ^a	$R_{\theta JA}$	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 75A.
- Pulse width limited by maximum junction temperature

Electrical Characteristics

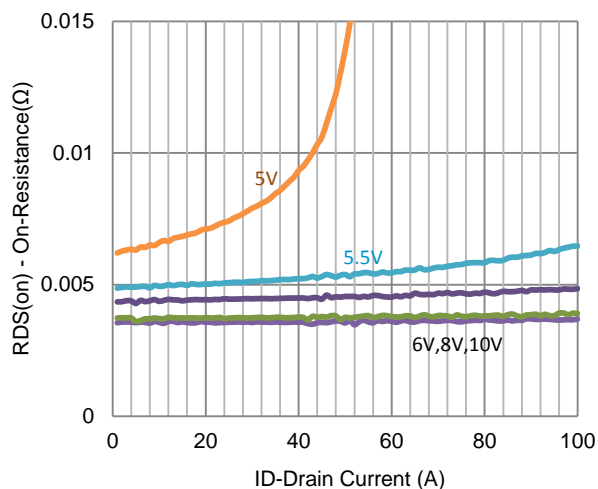
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu A$	1			V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 32 V, V_{GS} = 0 V$			1	uA
		$V_{DS} = 32 V, V_{GS} = 0 V, T_J = 55^\circ C$			25	
On-State Drain Current	$I_{D(on)}$	$V_{DS} = 5 V, V_{GS} = 10 V$	120			A
Drain-Source On-Resistance	$r_{DS(on)}$	$V_{GS} = 10 V, I_D = 45 A$			4	mΩ
		$V_{GS} = 5.5 V, I_D = 40 A$			6	
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
Dynamic						
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

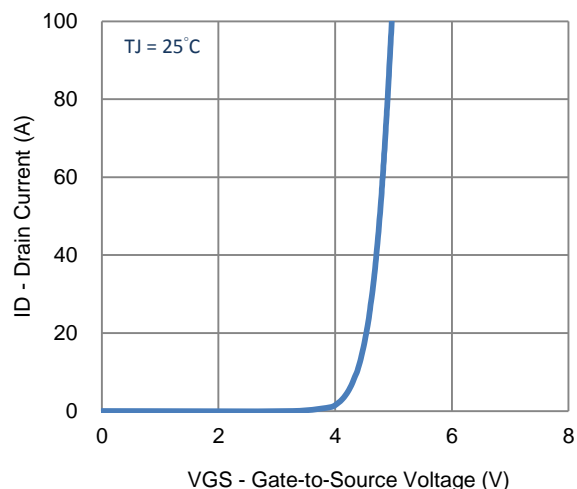
- Pulse test: PW ≤ 300us duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.

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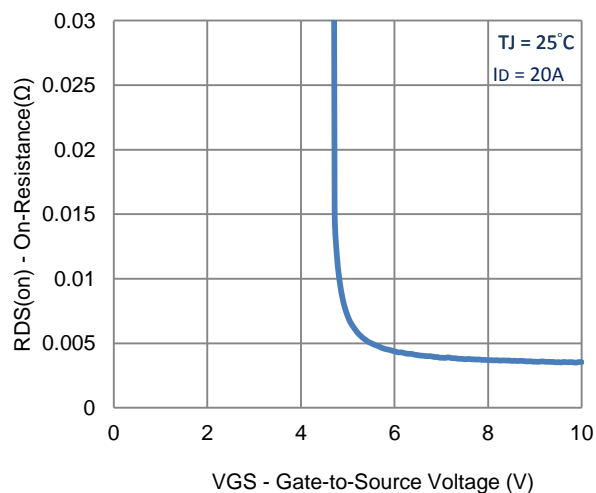
Typical Electrical Characteristics



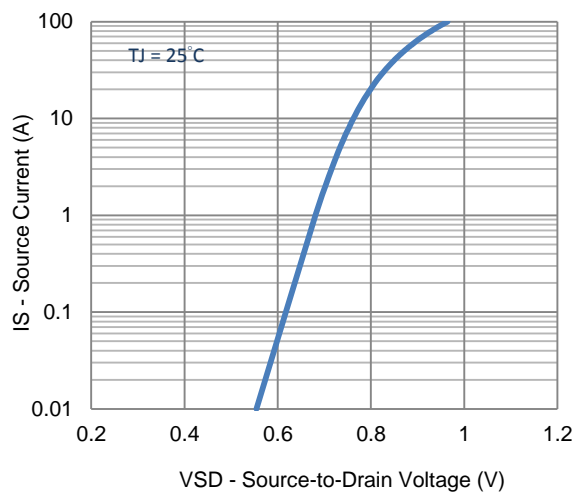
1. On-Resistance vs. Drain Current



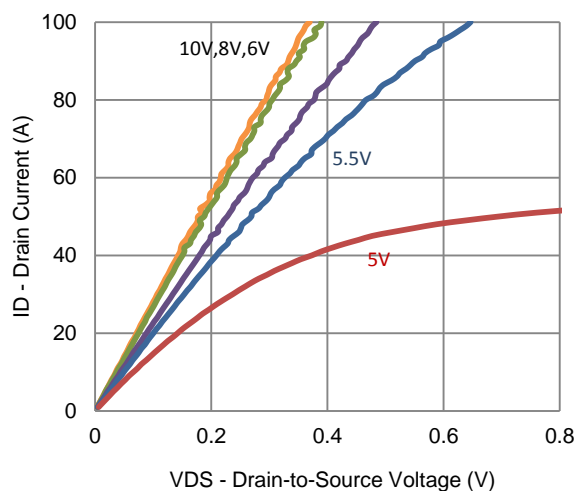
2. Transfer Characteristics



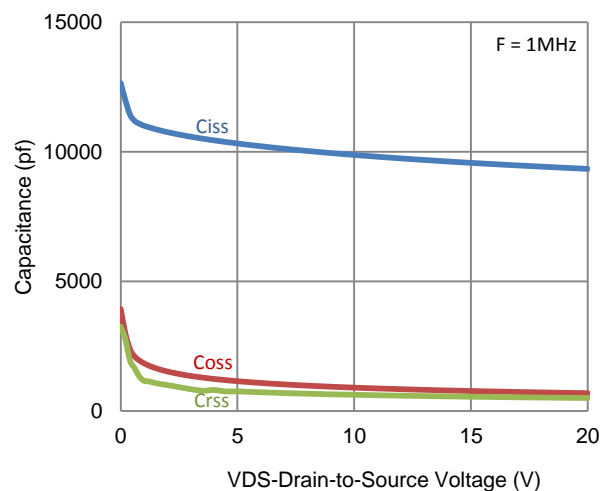
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

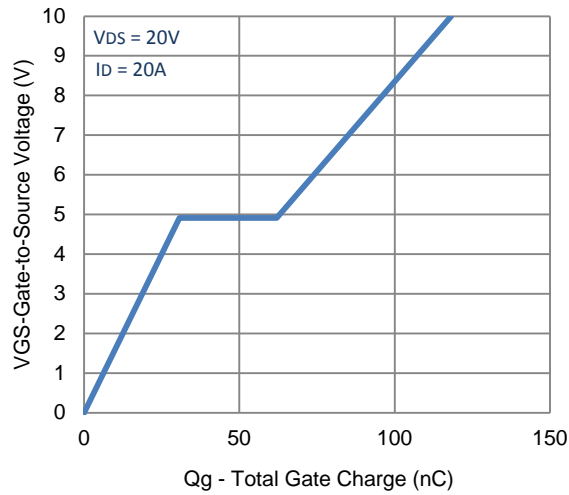


5. Output Characteristics

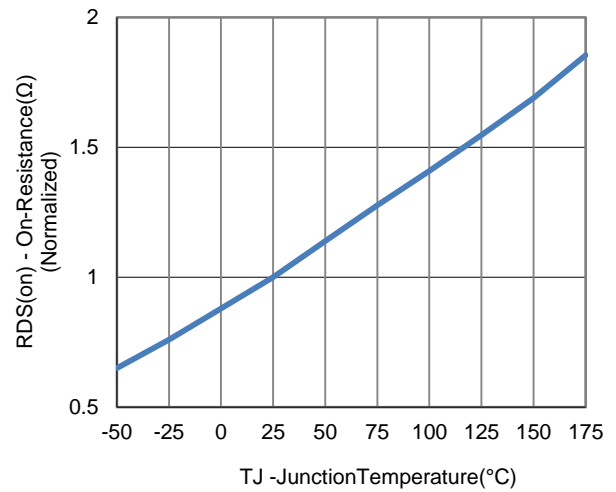


6. Capacitance

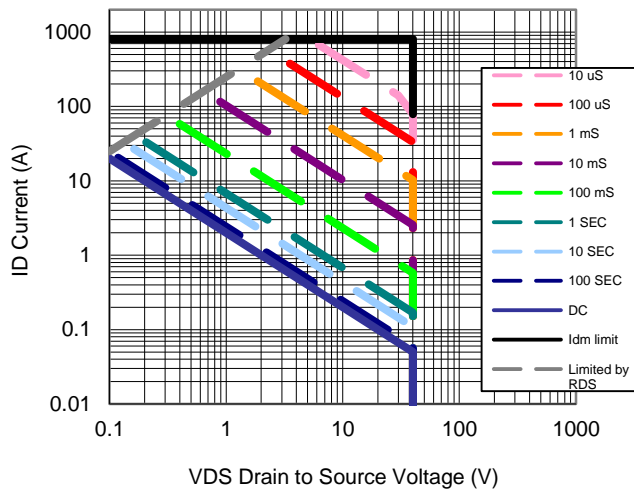
Typical Electrical Characteristics



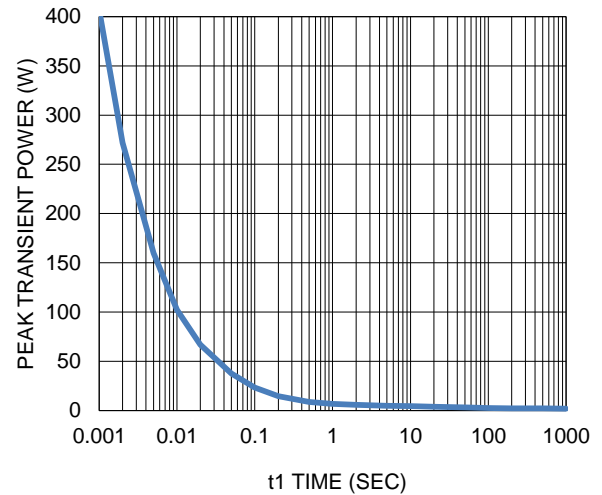
7. Gate Charge



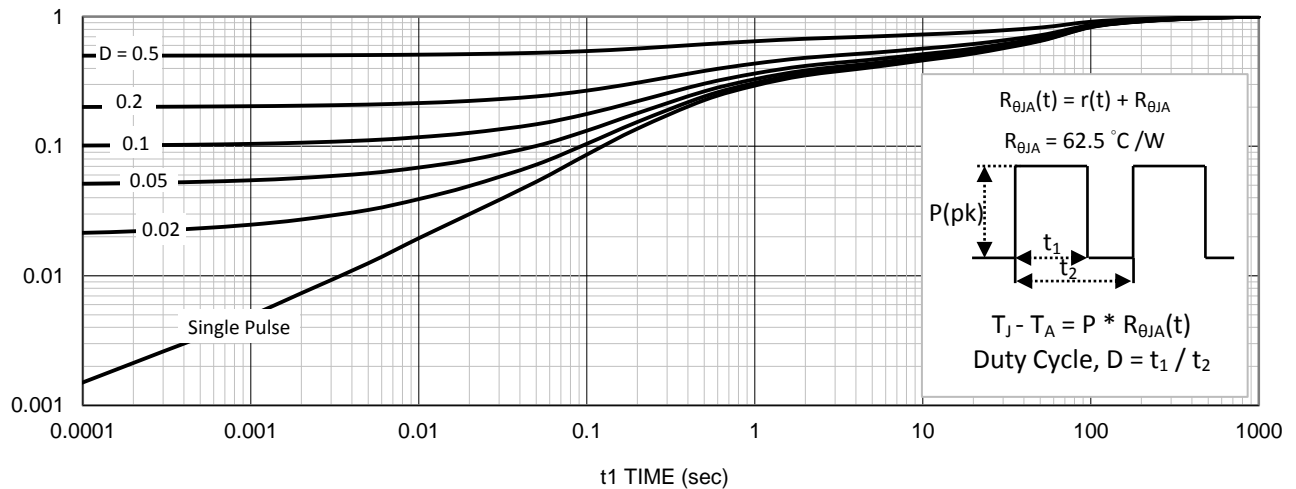
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

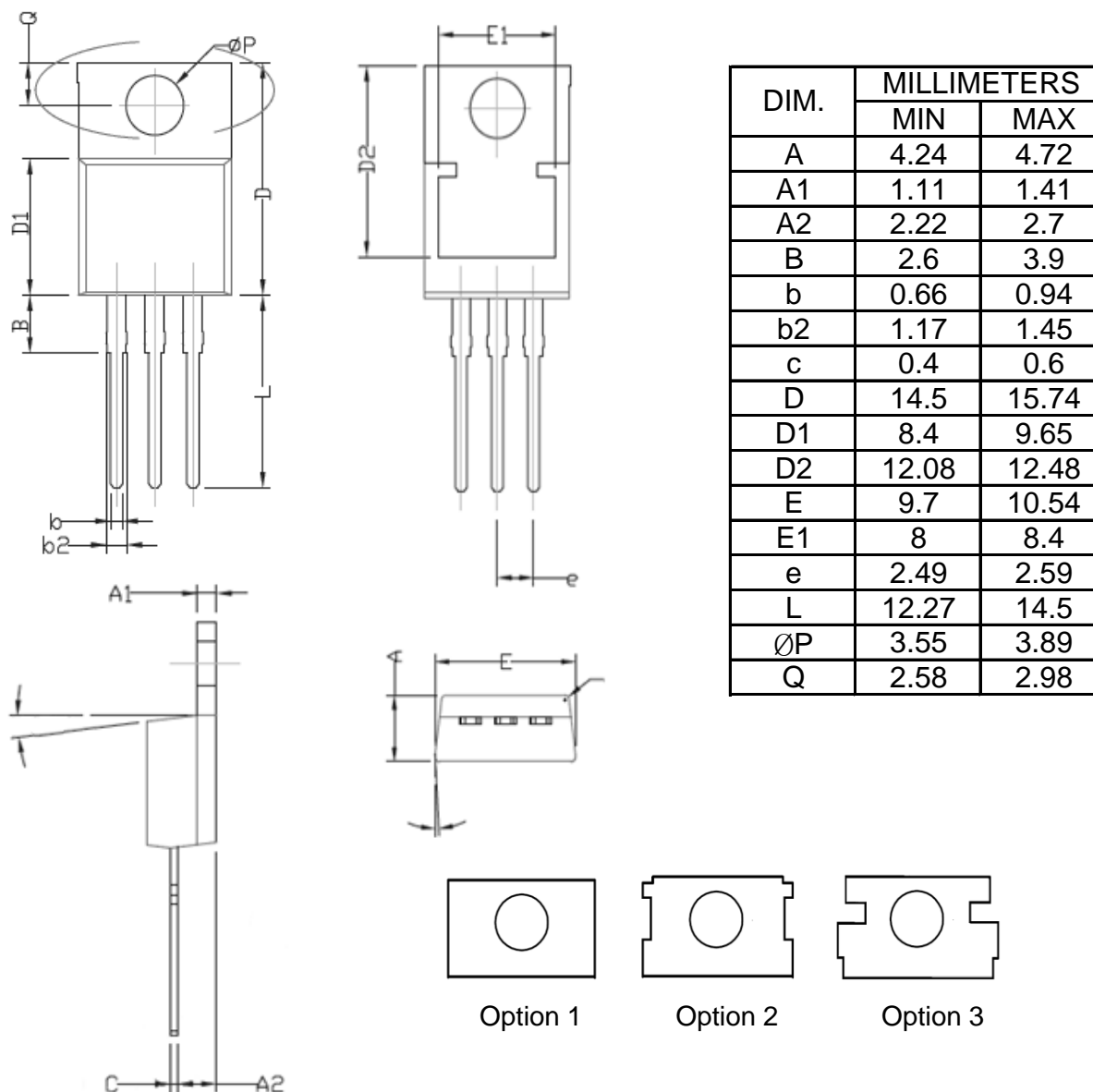


10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information



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