

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

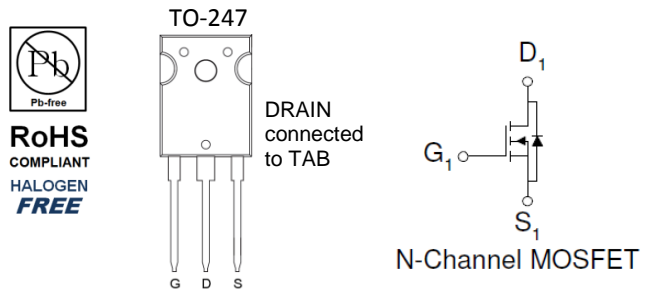
### Key Features:

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

### Typical Applications:

- Hot Swap Inrush Limit Circuits
- Uninterruptible Power Supplies and Inverters
- Motor Speed Controls

PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ (m $\Omega$ )	$I_D$ (A)
40	1.5 @ $V_{GS} = 10V$	500 <sup>a</sup>
	2.5 @ $V_{GS} = 6V$	



ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ C$ UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Units
Drain-Source Voltage		$V_{DS}$	40	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	
Continuous Drain Current	$T_C = 25^\circ C$	$I_D$	500	A
Pulsed Drain Current <sup>a</sup>		$I_{DM}$	1250	
Continuous Source Current (Diode Conduction)	$T_C = 25^\circ C$	$I_S$	500	A
Power Dissipation	$T_C = 25^\circ C$	$P_D$	500	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	$R_{\theta JA}$	40	$^\circ C/W$
Maximum Junction-to-Case	$R_{\theta JC}$	0.29	

Notes

- a. Pulse width limited by maximum junction temperature

## Electrical Characteristics

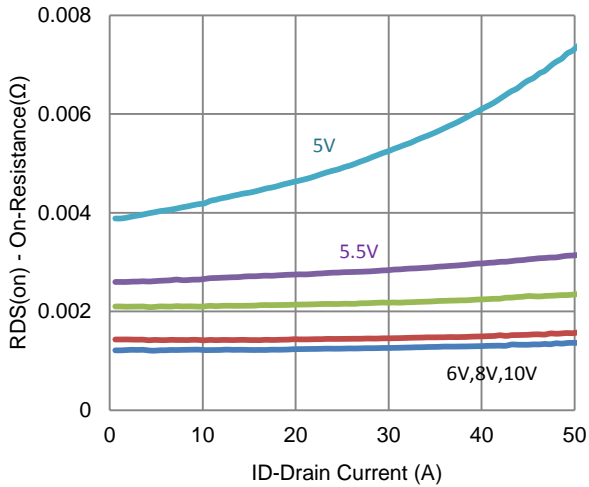
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu A$	1			V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 32 V, V_{GS} = 0 V$			1	uA
		$V_{DS} = 32 V, V_{GS} = 0 V, T_J = 55^\circ C$			25	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} = 5 V, V_{GS} = 10 V$	625			A
Drain-Source On-Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = 10 V, I_D = 100 A$			1.5	mΩ
		$V_{GS} = 6 V, I_D = 80 A$			2.5	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15 V, I_D = 20 A$		63		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = 50 A, V_{GS} = 0 V$		1		V
<b>Dynamic <sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = 20 V, V_{GS} = 6 V,$ $I_D = 20 A$		213		nC
Gate-Source Charge	$Q_{gs}$			97		
Gate-Drain Charge	$Q_{gd}$			81		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 20 V, R_L = 1 \Omega,$ $I_D = 20 A,$ $V_{GEN} = 10 V, R_{GEN} = 6 \Omega$		106		ns
Rise Time	$t_r$			130		
Turn-Off Delay Time	$t_{d(off)}$			325		
Fall Time	$t_f$			112		
Input Capacitance	$C_{iss}$	$V_{DS} = 15 V, V_{GS} = 0 V, f = 1 \text{ Mhz}$		27557		pF
Output Capacitance	$C_{oss}$			2212		
Reverse Transfer Capacitance	$C_{rss}$			1250		

## Notes

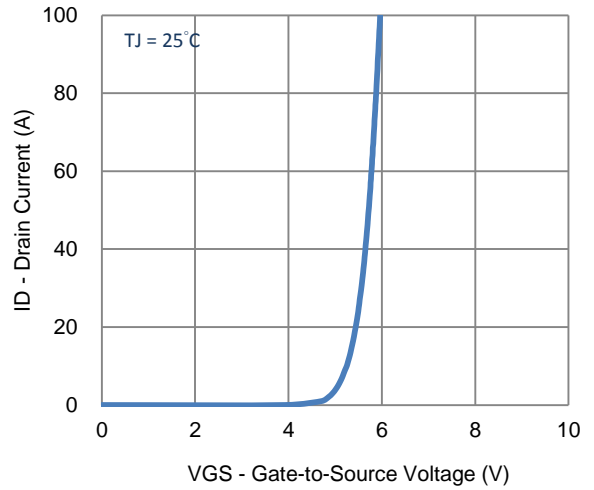
- Pulse test:  $PW \leq 300 \mu s$  duty cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.

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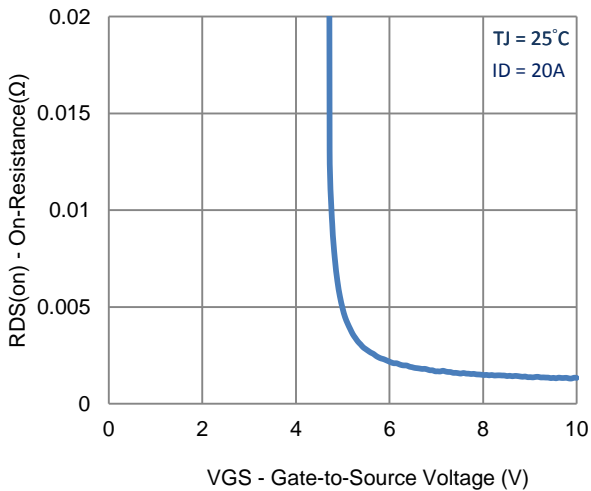
Typical Electrical Characteristics



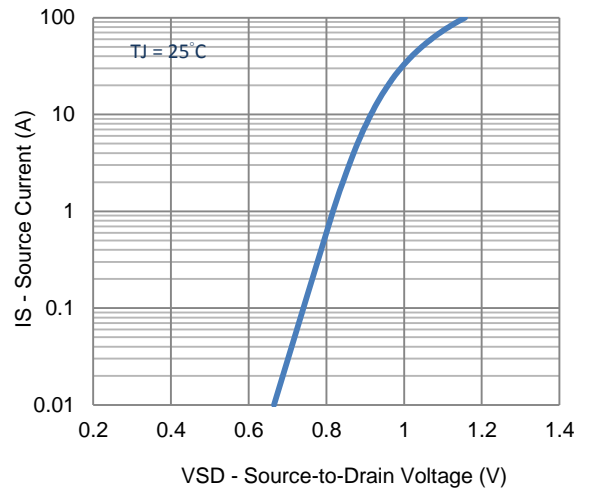
1. On-Resistance vs. Drain Current



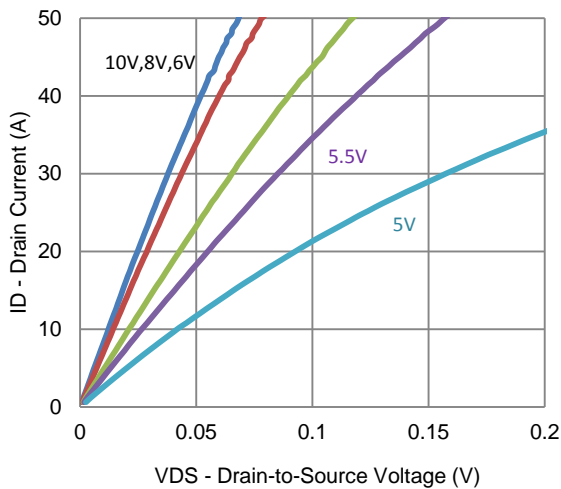
2. Transfer Characteristics



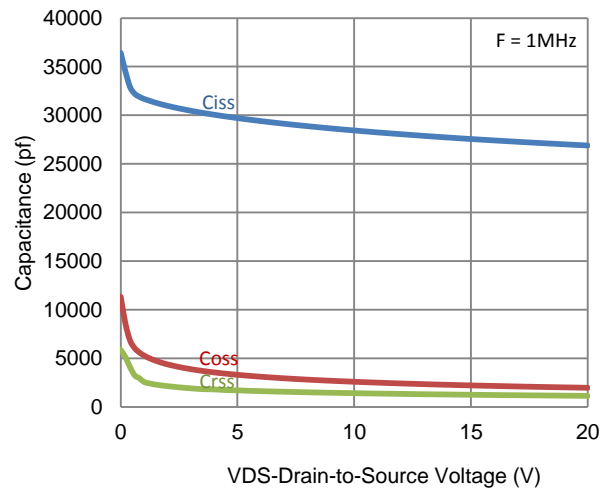
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

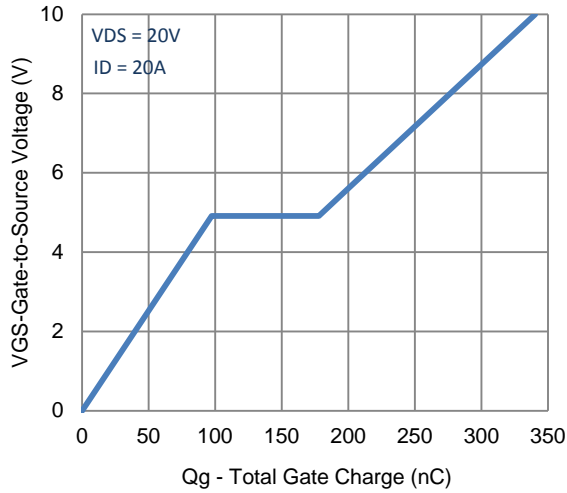


5. Output Characteristics

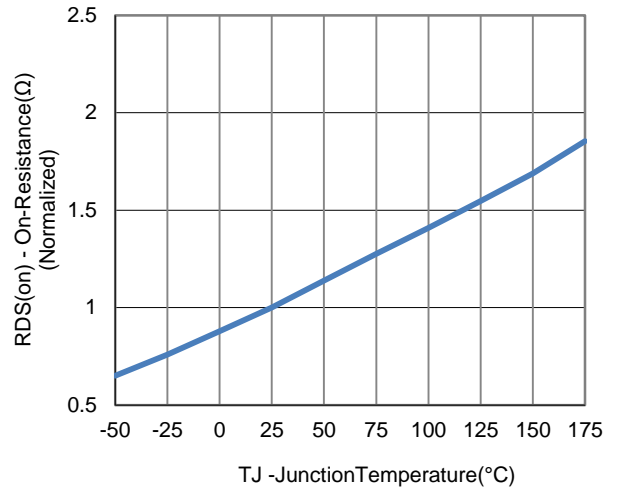


6. Capacitance

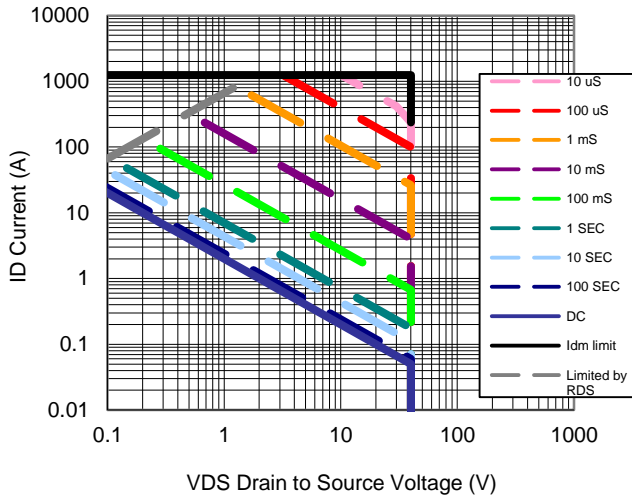
Typical Electrical Characteristics



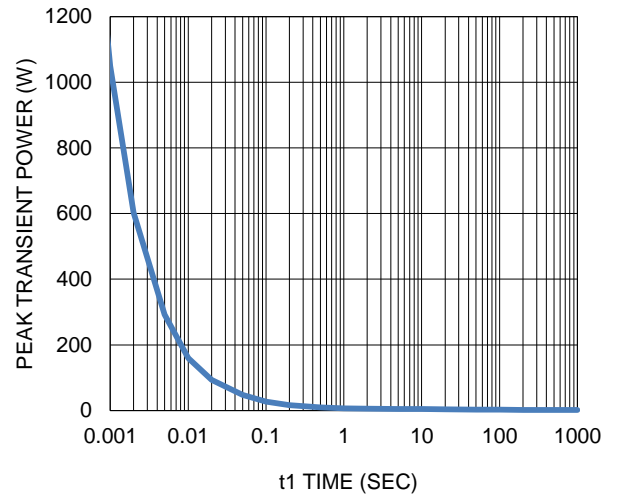
7. Gate Charge



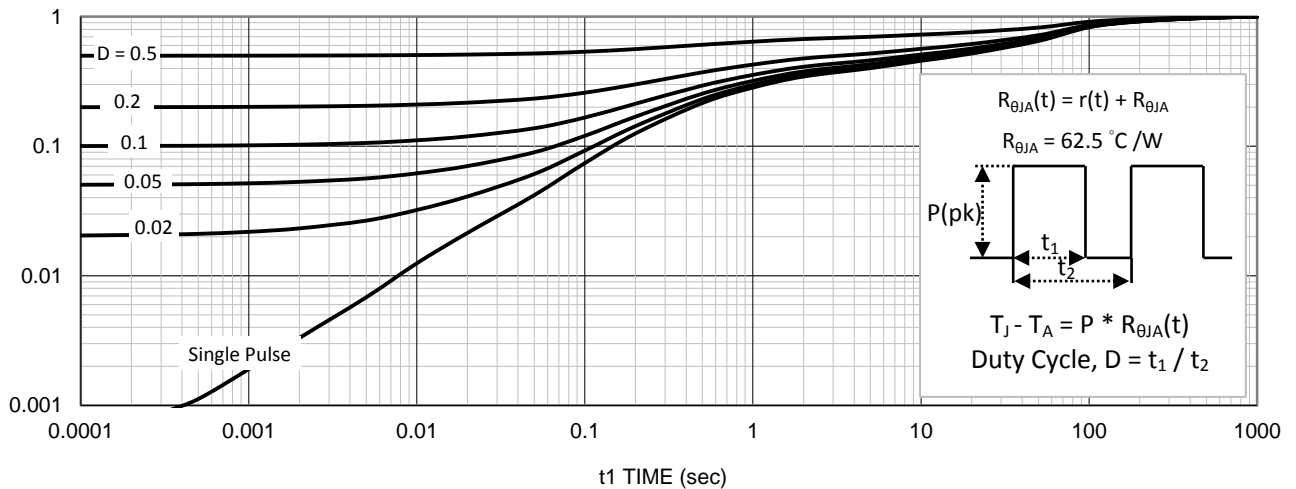
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

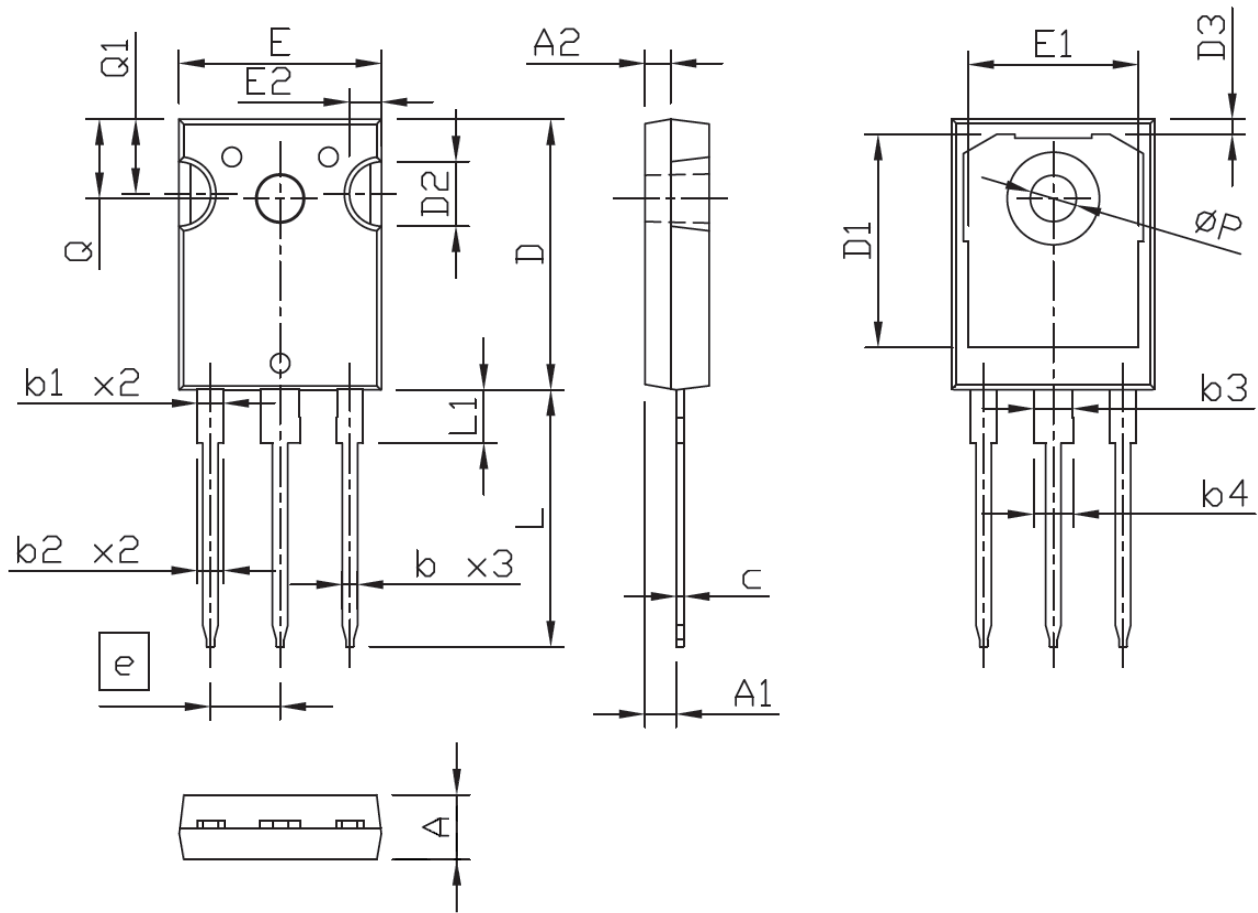


10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information



SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	4,90	5,00	5,10
A1	2,32	2,42	2,52
A2	1,90	2,00	2,10
b	1,17	1,22	1,27
b1	1,97	2,02	2,07
b2	2,00	2,10	2,20
b3	2,97	3,02	3,07
b4	3,00	3,10	3,20
c	0,59	0,62	0,66
D	20,90	21,00	21,10
D1	16,25	16,55	16,85
D2	5,00 TYP		
D3	1,05	1,20	1,35
e	5,44 BSC		
E	15,70	15,80	15,90
E1	13,06	13,26	13,46
E2	2,50 TYP		
L	19,72	19,92	20,12
L1	---	---	4,30
Q	6,15 BSC		
Q1	5,60	5,80	6,00
ØP	3,55	3,60	3,65