

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

Key Features:

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

Typical Applications:

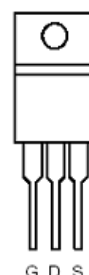
- White LED boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (m Ω)	I_D (A)
-40	5 @ $V_{GS} = -10V$	-90 ^a
	6.6 @ $V_{GS} = -4.5V$	

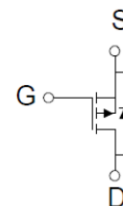


RoHS
COMPLIANT
HALOGEN
FREE

TO-220CFM



Top View



P-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	-90	A
Pulsed Drain Current ^b		I_{DM}	-360	
Continuous Source Current (Diode Conduction) ^a	$T_C = 25^\circ\text{C}$	I_S	-90	A
Power Dissipation ^a	$T_C = 25^\circ\text{C}$	P_D	60	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	$R_{\theta JC}$	2.5	

Notes

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

Electrical Characteristics

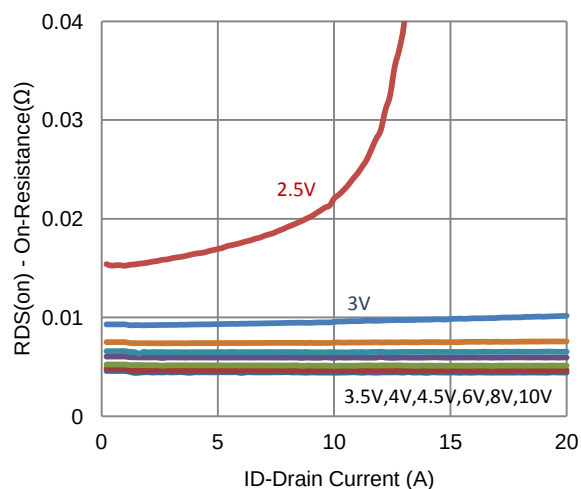
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250 \mu A$	-1			V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -32 V, V_{GS} = 0 V$			-1	μA
		$V_{DS} = -32 V, V_{GS} = 0 V, T_J = 55^\circ C$			-10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = -5 V, V_{GS} = -10 V$	-135			A
Drain-Source On-Resistance ^a	$r_{DS(on)}$	$V_{GS} = -10 V, I_D = -20 A$			5	m Ω
		$V_{GS} = -4.5 V, I_D = -18 A$			6.6	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -20 V, I_D = -20 A$		68		S
Diode Forward Voltage ^a	V_{SD}	$I_S = -45 A, V_{GS} = 0 V$		-0.89		V
Dynamic ^b						
Total Gate Charge	Q_g	$V_{DS} = -20 V, V_{GS} = -4.5 V,$ $I_D = -2 A$		108		nC
Gate-Source Charge	Q_{gs}			27		
Gate-Drain Charge	Q_{gd}			34		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = -20 V, R_L = 10 \Omega,$ $I_D = -2 A,$ $V_{GEN} = -10 V, R_{GEN} = 6 \Omega$		30		ns
Rise Time	t_r			27		
Turn-Off Delay Time	$t_{d(off)}$			306		
Fall Time	t_f			104		
Input Capacitance	C_{iss}	$V_{DS} = -20 V, V_{GS} = 0 V, f = 1 Mhz$		6488		pF
Output Capacitance	C_{oss}			556		
Reverse Transfer Capacitance	C_{rss}			503		

Notes

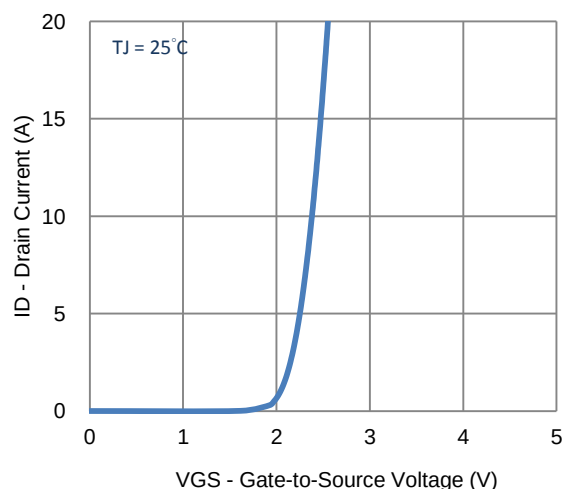
- a. Pulse test: PW ≤ 300us duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

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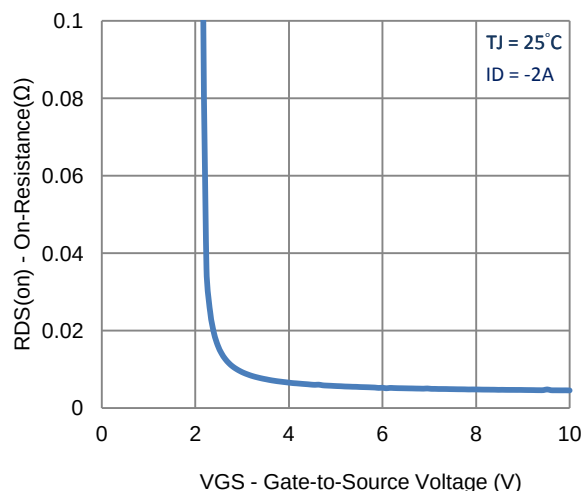
Typical Electrical Characteristics



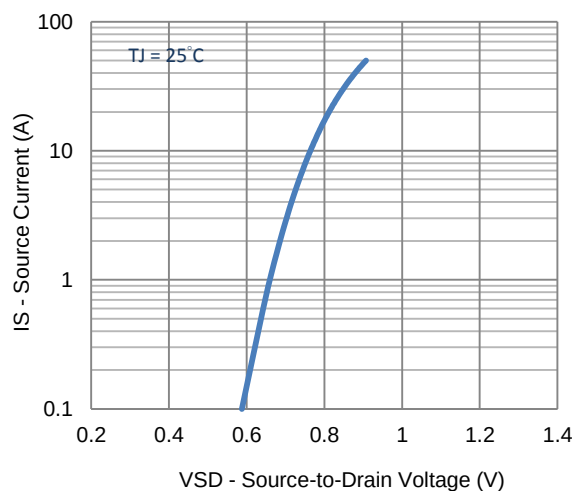
1. On-Resistance vs. Drain Current



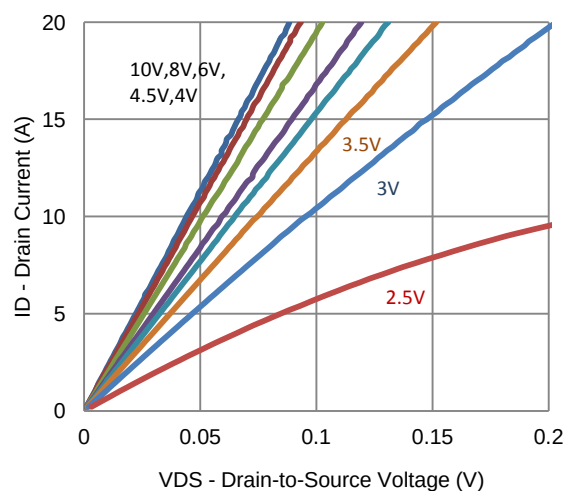
2. Transfer Characteristics



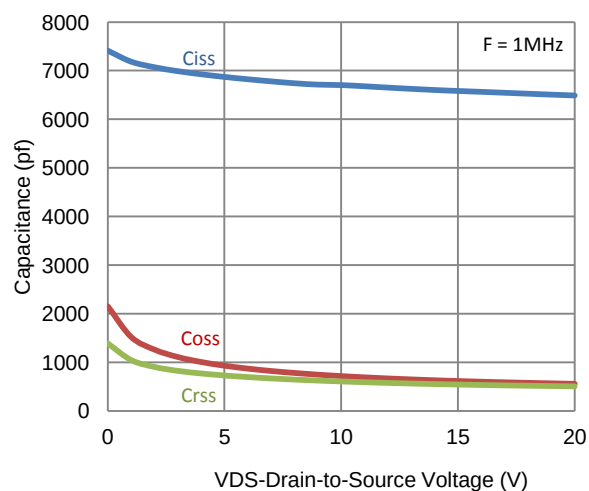
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

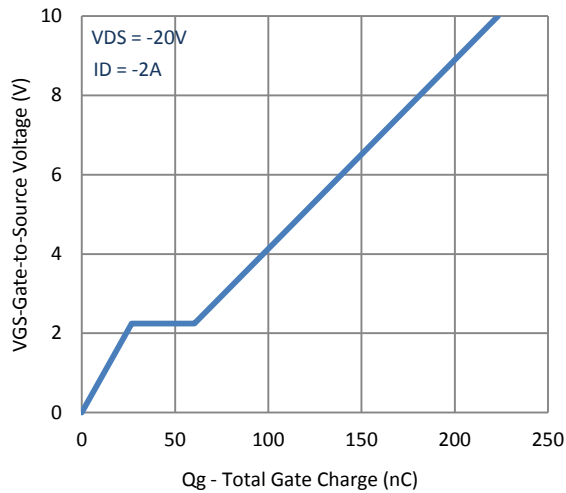


5. Output Characteristics

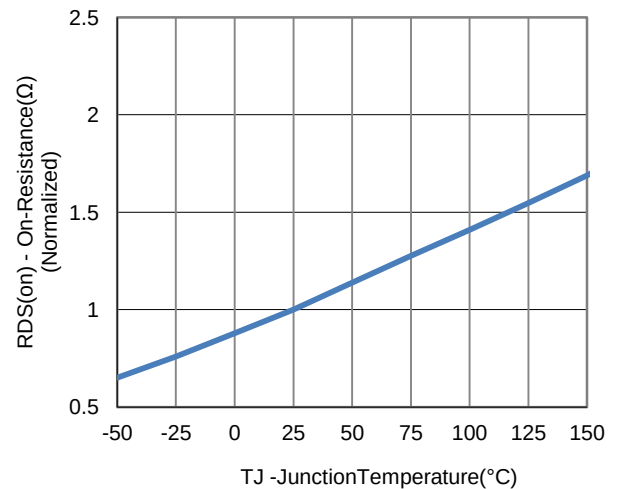


6. Capacitance

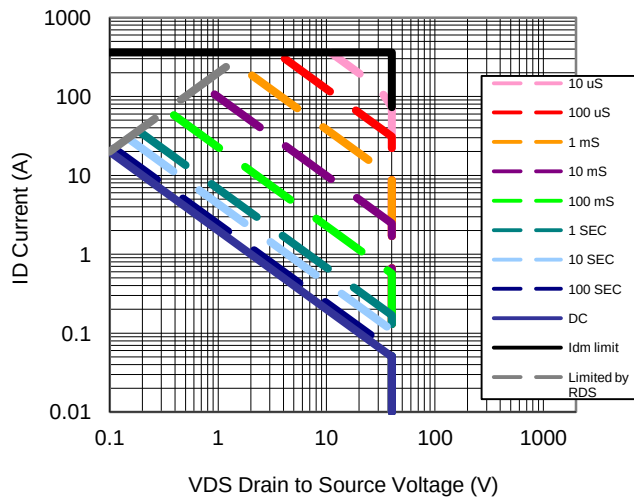
Typical Electrical Characteristics



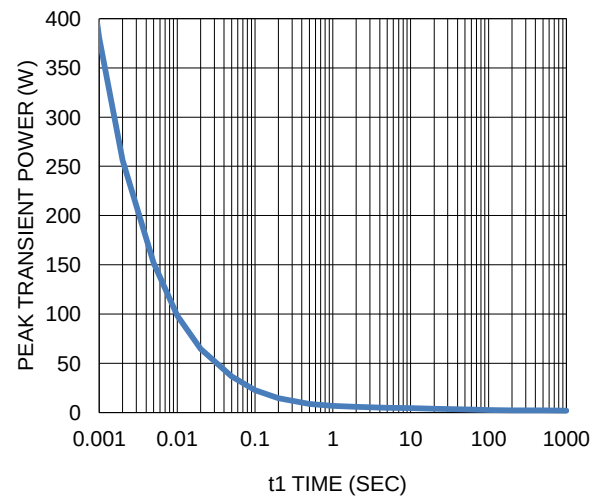
7. Gate Charge



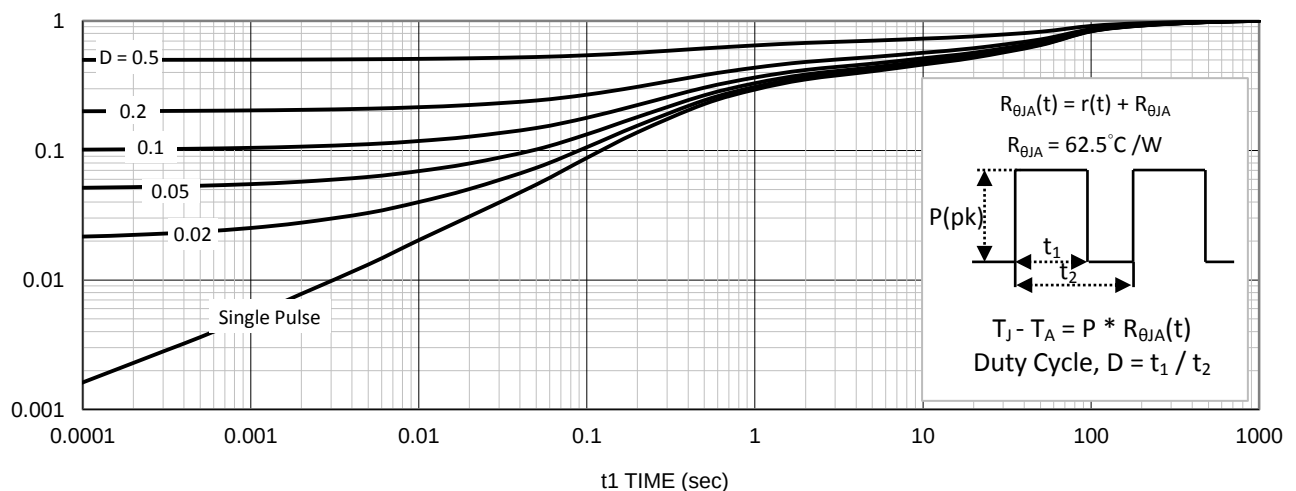
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

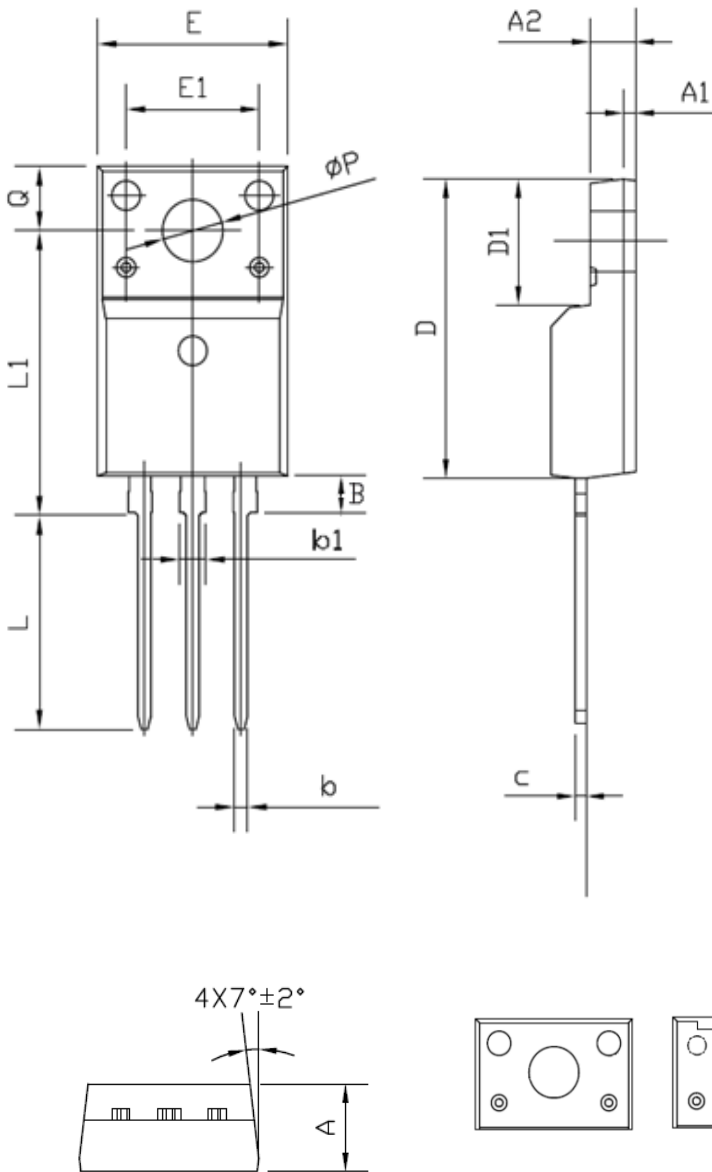


10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information



DIM.	MILLIMETERS	
	MIN	MAX
A	4.24	4.72
A1	1.11	1.41
A2	2.22	2.7
B	2.6	3.9
b	0.66	0.94
b2	1.17	1.45
c	0.4	0.6
D	14.5	15.74
D1	8.4	9.65
D2	12.08	12.48
E	9.7	10.54
E1	8	8.4
e	2.49	2.59
L	12.27	14.5
ØP	3.55	3.89
Q	2.58	2.98

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