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

Key Features:

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

Typical Applications:

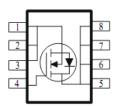
- · White LED boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits

PRODUCT SUMMARY			
V _{DS} (V)	$r_{DS(on)}(m\Omega)$	I⊳(A)	
40	15 @ V _{GS} = 10V	15	
40	$18 @ V_{GS} = 4.5V$	14	









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}	±20	V			
Continuous Drain Current a	T _A =25°C	I _D	15				
Continuous Drain Current	T _A =70°C	'D	12	Α			
Pulsed Drain Current ^b		I _{DM}	50				
Continuous Source Current (Diode Conduction) a		I _S	6.4	Α			
Power Dissipation ^a	T _A =25°C	P _D	5	W			
Fower Dissipation	T _A =70°C	' D	3.2	• • •			
Operating Junction and Storage Temperature Range		T_J,T_stg	-55 to 150	°C			

THERMAL RESISTANCE RATINGS							
Parameter	Symbol	Maximum	Units				
Maximum Junction-to-Ambient ^a	t <= 10 sec	$R_{\theta JA}$	25	°C/W			
Maximum Junction-to-Ambient	Steady State		65	C/VV			

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Notes

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

Electrical Characteristics

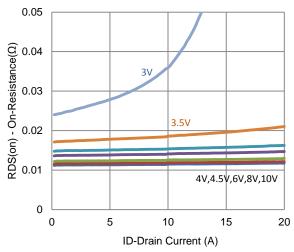
Parameter	Symbol	Test Conditions	Min	Тур	Max	Unit	
Static							
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_{D} = 250 \text{ uA}$	1			V	
Gate-Body Leakage	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			±100	nA	
Zero Gate Voltage Drain Current		$V_{DS} = 32 \text{ V}, V_{GS} = 0 \text{ V}$			1	uA	
Zero Gate Voltage Brain Gunerit	I _{DSS}	$V_{DS} = 32 \text{ V}, V_{GS} = 0 \text{ V}, T_{J} = 55^{\circ}\text{C}$			25		
On-State Drain Current ^a	I _{D(on)}	$V_{DS} = 5 \text{ V}, V_{GS} = 10 \text{ V}$	25			Α	
Drain-Source On-Resistance ^a	r	$V_{GS} = 10 \text{ V}, I_{D} = 12 \text{ A}$			15	mΩ	
Drain-Source On-Resistance	r _{DS(on)}	$V_{GS} = 4.5 \text{ V}, I_D = 9.6 \text{ A}$			18		
Forward Transconductance ^a	g _{fs}	$V_{DS} = 15 \text{ V}, I_{D} = 12 \text{ A}$		22		S	
Diode Forward Voltage ^a	V_{SD}	$I_S = 3.2 \text{ A}, V_{GS} = 0 \text{ V}$		0.75		V	
		Dynamic ^b					
Total Gate Charge	Q_g	$V_{DS} = 20 \text{ V}, V_{GS} = 4.5 \text{ V},$		19		nC	
Gate-Source Charge	Q_{gs}	$V_{DS} = 20 \text{ V}, V_{GS} = 4.3 \text{ V},$ $I_{D} = 12 \text{ A}$		5.0			
Gate-Drain Charge	Q_gd	10 = 12 A		9.1			
Turn-On Delay Time	t _{d(on)}			7			
Rise Time	t _r	$V_{DS} = 20 \text{ V}, R_L = 1.7 \Omega, I_D = 12 \text{ A},$		38		ns	
Turn-Off Delay Time	$t_{d(off)}$	V_{GEN} = 10 V, R_{GEN} = 6 Ω		62			
Fall Time	t _f			24			
Input Capacitance	C _{iss}			1826			
Output Capacitance	C _{oss}	$V_{DS} = 15 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ Mhz}$		253		pF	
Reverse Transfer Capacitance	C_{rss}			208			

Notes

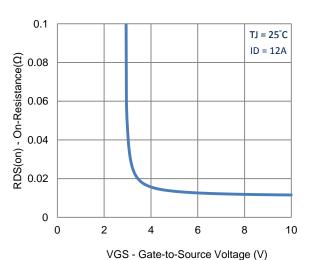
- Pulse test: PW <= 300us duty cycle <= 2%. a.
- Guaranteed by design, not subject to production testing. b.

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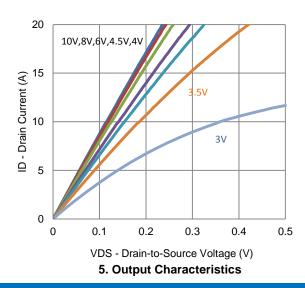
Typical Electrical Characteristics

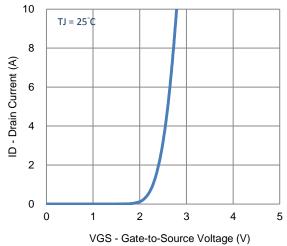


1. On-Resistance vs. Drain Current

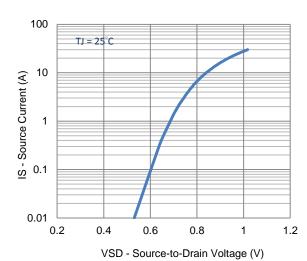


3. On-Resistance vs. Gate-to-Source Voltage

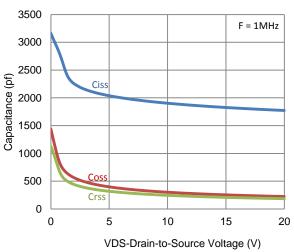




2. Transfer Characteristics

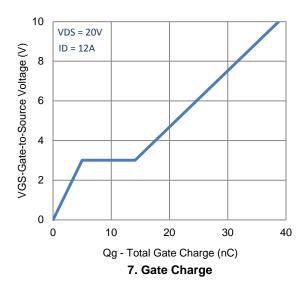


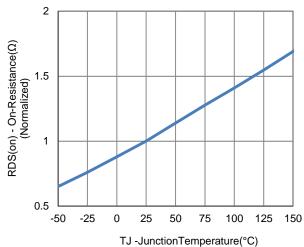
4. Drain-to-Source Forward Voltage

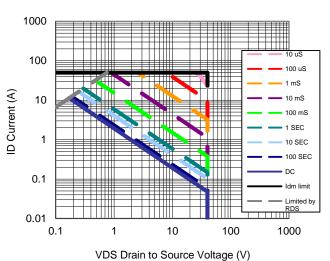


6. Capacitance

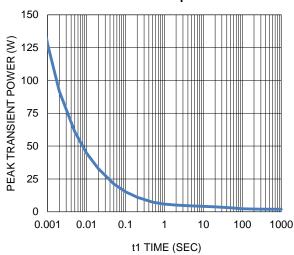
Typical Electrical Characteristics





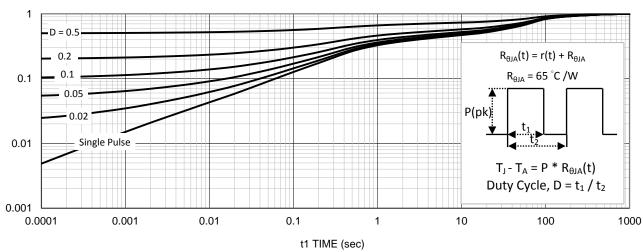


8. Normalized On-Resistance Vs
Junction Temperature



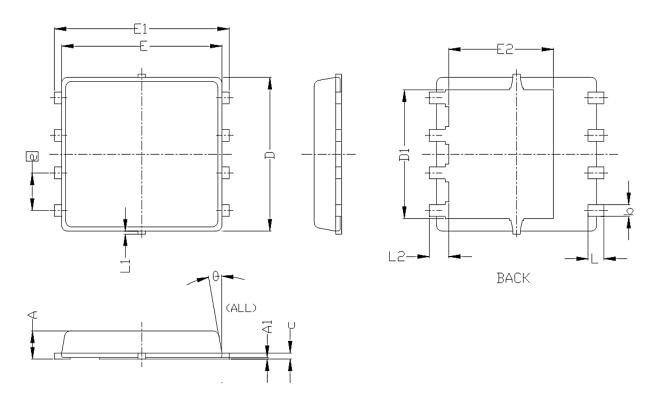
9. Safe Operating Area

10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES				
STMBULS	MIN	NOM	MAX	MIN	NOM	MAX		
A	0.85	0. 95	1.00	0.033	0.037	0.039		
Al	0.00		0.05	0.000		0.002		
b	0.30	0.40	0.50	0.012	0.016	0.020		
С	0. 15	0. 20	0. 25	0.006	0.008	0.010		
D		5, 20 BSC			0. 205 BSC			
D1	4. 35 BSC			0. 171 BSC				
Е	5, 55 BSC			0. 219 BSC				
E1	6. 05 BSC			0. 238 BSC				
E2	3. 62 BSC			0. 143 BSC				
e	1. 27 BSC			0. 050 BSC				
L	0.45	0.55	0.65	0.018	0.022	0.026		
L1	0		0. 15	0		0.006		
L2	0.68 REF			0. 027 REF				
θ	0°		10°	0°		10°		