

N-Channel 60-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

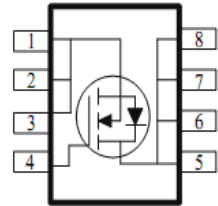
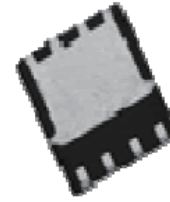
PRODUCT SUMMARY

V_{DS} (V)	$r_{DS(on)}$ (m Ω)	I_D (A)
60	3.9 @ $V_{GS} = 10V$	29
	4.5 @ $V_{GS} = 4.5V$	27

DFN5X6-8L



RoHS
COMPLIANT
HALOGEN
FREE



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

Parameter	Symbol	Limit	Units
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ^a	I_D	29	A
		23	
Pulsed Drain Current ^b	I_{DM}	100	
Continuous Source Current (Diode Conduction) ^a	I_S	7	A
Power Dissipation ^a	P_D	5	W
		3.2	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Maximum	Units
Maximum Junction-to-Ambient ^a	$R_{\theta JA}$	25	$^\circ\text{C/W}$
		65	

Notes

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

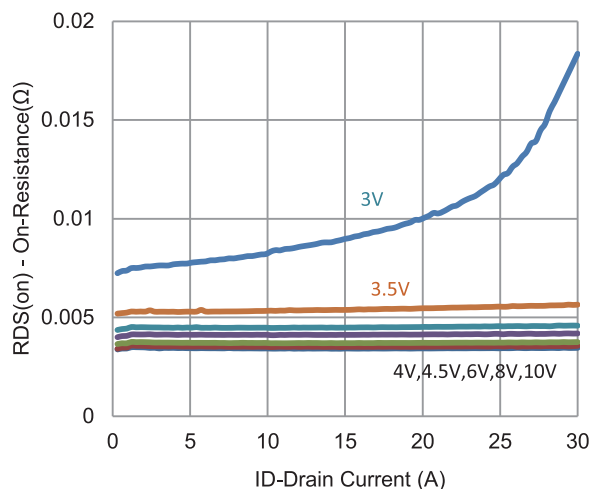
Electrical Characteristics

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}	$V_{DS} = 48 V, V_{GS} = 0 V$			1	μA
		$V_{DS} = 48 V, V_{GS} = 0 V, T_J = 55^\circ C$			10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = 5 V, V_{GS} = 10 V$	40			A
Drain-Source On-Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10 V, I_D = 20 A$			3.9	m Ω
		$V_{GS} = 4.5 V, I_D = 16 A$			4.5	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15 V, I_D = 20 A$		106		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 3.5 A, V_{GS} = 0 V$		0.72		V
Dynamic ^b						
Total Gate Charge	Q_g	$V_{DS} = 30 V, V_{GS} = 4.5 V,$ $I_D = 2 A$		60		nC
Gate-Source Charge	Q_{gs}			20		
Gate-Drain Charge	Q_{gd}			17		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 30 V, R_L = 15 \Omega,$ $I_D = 2 A,$ $V_{GEN} = 10 V, R_{GEN} = 6 \Omega$		20		ns
Rise Time	t_r			20		
Turn-Off Delay Time	$t_{d(off)}$			176		
Fall Time	t_f			50		
Input Capacitance	C_{iss}	$V_{DS} = 15 V, V_{GS} = 0 V, f = 1 Mhz$		7283		pF
Output Capacitance	C_{oss}			477		
Reverse Transfer Capacitance	C_{rss}			292		

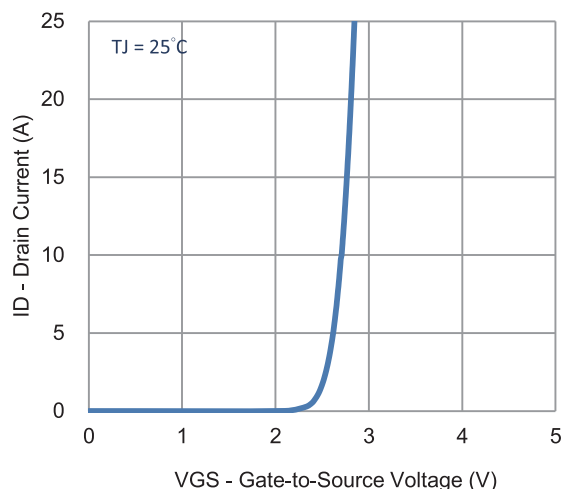
Notes

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

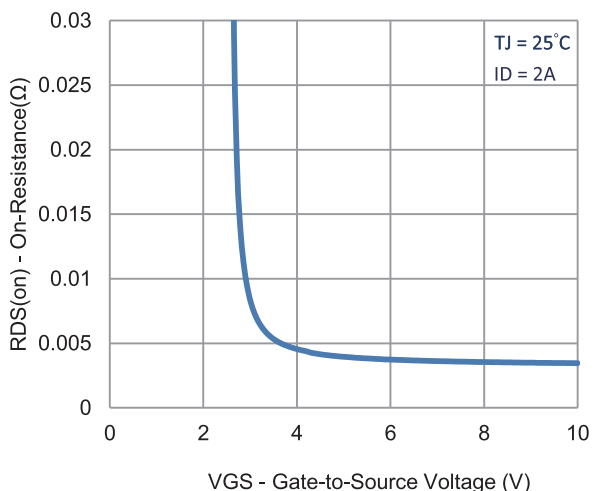
Typical Electrical Characteristics



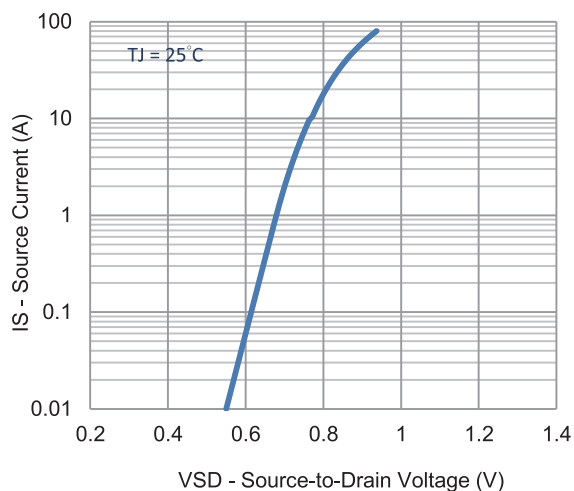
1. On-Resistance vs. Drain Current



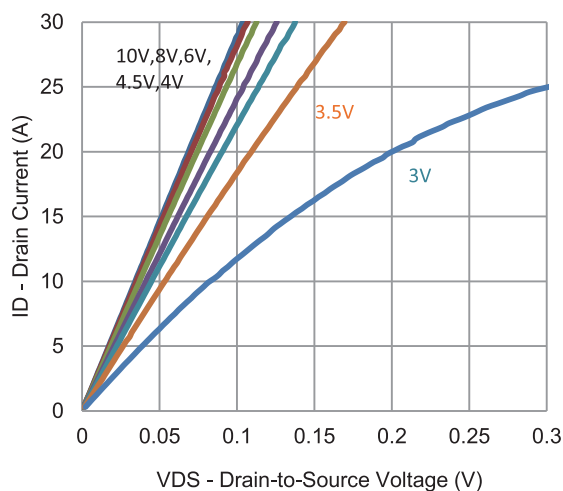
2. Transfer Characteristics



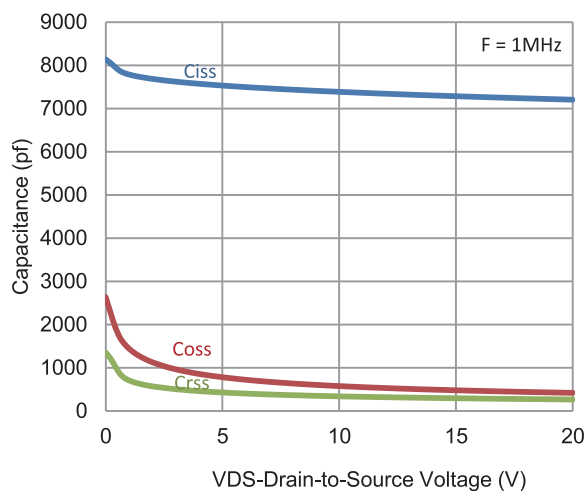
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

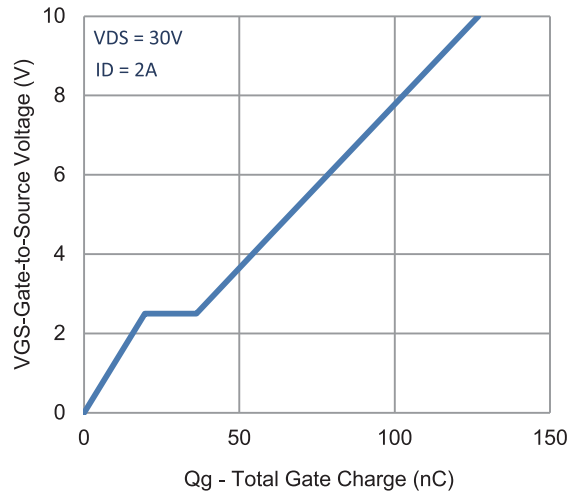


5. Output Characteristics

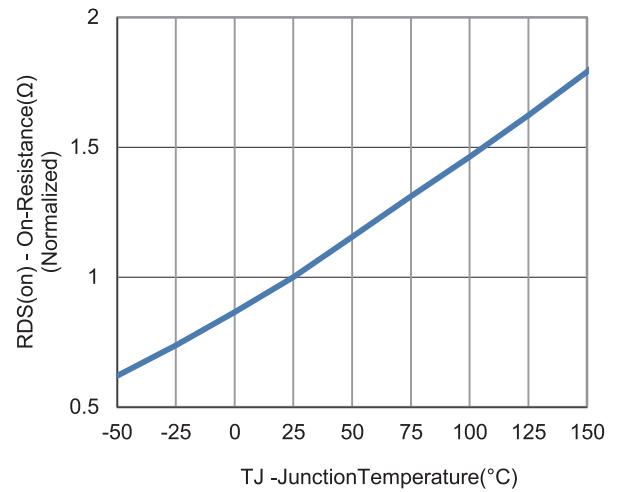


6. Capacitance

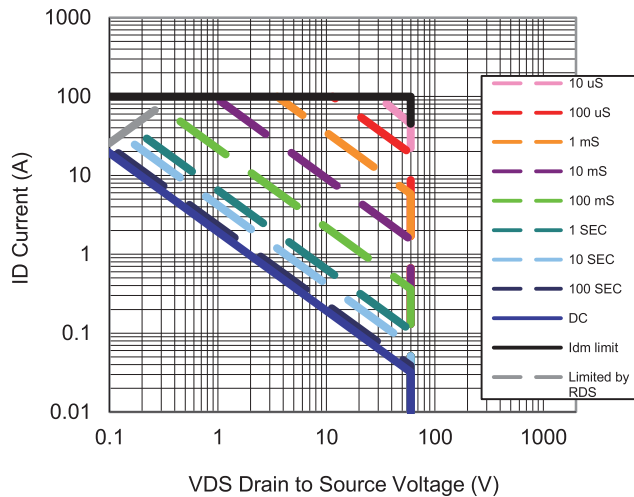
Typical Electrical Characteristics



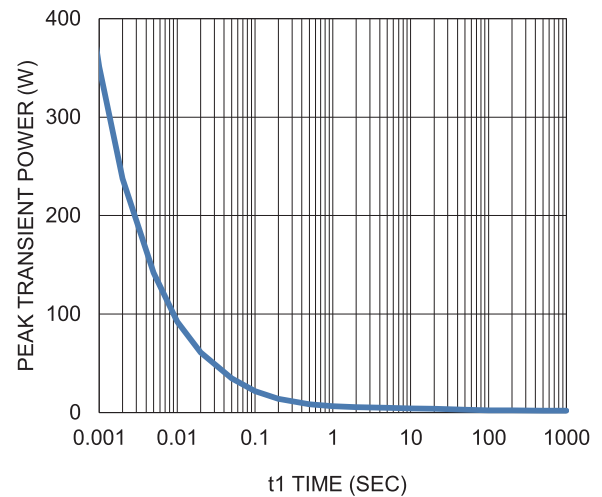
7. Gate Charge



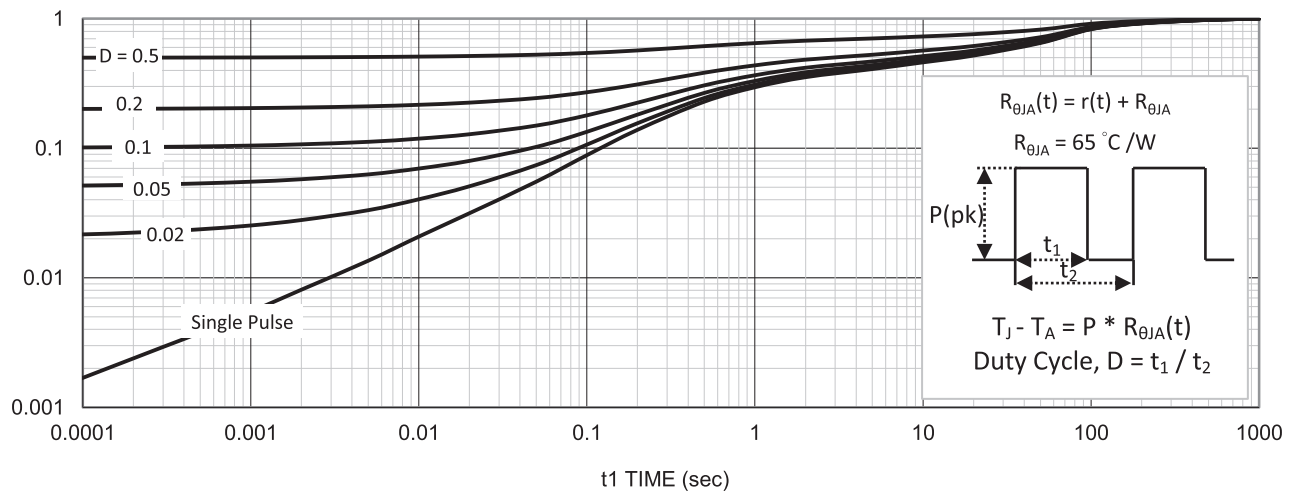
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

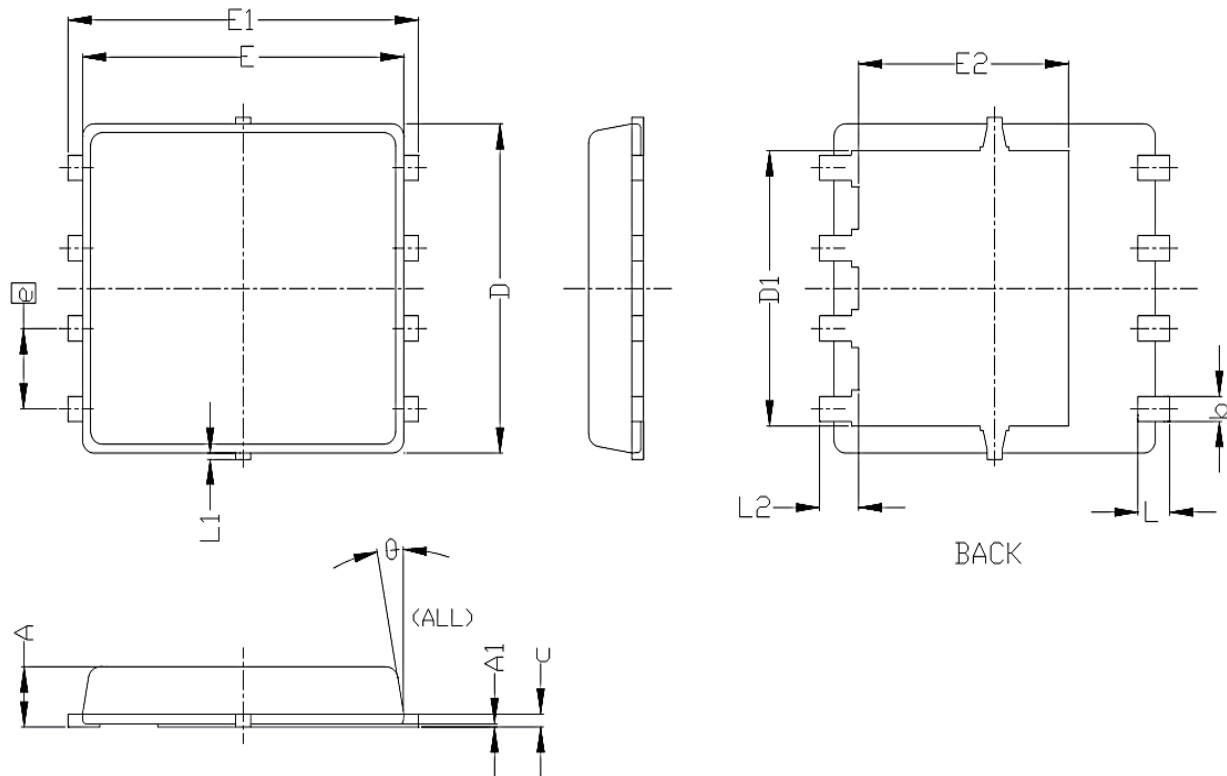


10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.85	0.95	1.00	0.033	0.037	0.039
A1	0.00	—	0.05	0.000	—	0.002
b	0.30	0.40	0.50	0.012	0.016	0.020
c	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		
E	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°