

## N-Channel 60-V (D-S) MOSFET

### Key Features:

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

### Typical Applications:

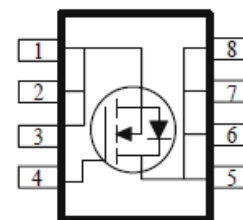
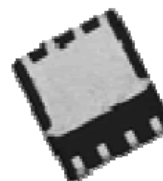
- White LED boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits

PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ (m $\Omega$ )	$I_D$ (A)
60	22 @ $V_{GS} = 10V$	13
	26 @ $V_{GS} = 4.5V$	12



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

DFN5X6-8L



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		$V_{GS}$	$\pm 20$	
Continuous Drain Current <sup>a</sup>	$T_A = 25^\circ\text{C}$	$I_D$	13	A
	$T_A = 70^\circ\text{C}$		11	
Pulsed Drain Current <sup>b</sup>		$I_{DM}$	50	
Continuous Source Current (Diode Conduction) <sup>a</sup>		$I_S$	4.6	A
Power Dissipation <sup>a</sup>	$T_A = 25^\circ\text{C}$	$P_D$	5	W
	$T_A = 70^\circ\text{C}$		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 <sup>a</sup>	$t \leq 10$ sec	$R_{\theta JA}$	25	$^\circ\text{C/W}$
	Steady State		65	

### Notes

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

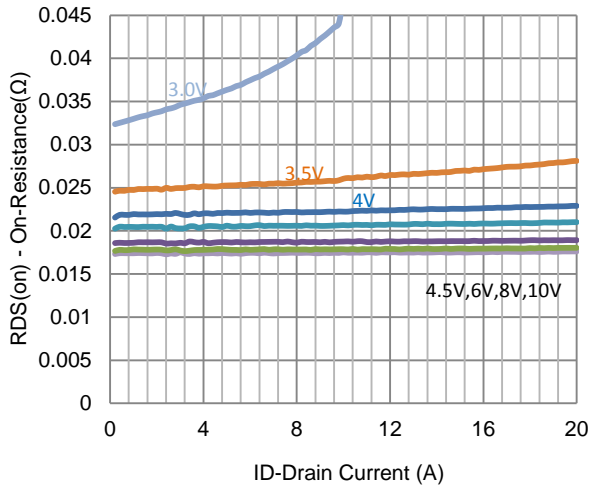
**Electrical Characteristics**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<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	$I_{DSS}$	$V_{DS} = 48 V, V_{GS} = 0 V$			1	uA
		$V_{DS} = 48 V, V_{GS} = 0 V, T_J = 55^\circ C$			25	
On-State Drain Current	$I_{D(on)}$	$V_{DS} = 5 V, V_{GS} = 10 V$	25			A
Drain-Source On-Resistance	$r_{DS(on)}$	$V_{GS} = 10 V, I_D = 10.4 A$			22	mΩ
		$V_{GS} = 4.5 V, I_D = 7.2 A$			26	
Forward Transconductance	$g_{fs}$	$V_{DS} = 15 V, I_D = 10.4 A$		20		S
Diode Forward Voltage	$V_{SD}$	$I_S = 2.3 A, V_{GS} = 0 V$		0.7		V
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS} = 30 V, V_{GS} = 4.5 V, I_D = 10.4 A$		20		nC
Gate-Source Charge	$Q_{gs}$			5.8		
Gate-Drain Charge	$Q_{gd}$			10		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 30 V, R_L = 2.9 \Omega, I_D = 10.4 A,$ $V_{GEN} = 10 V, R_{GEN} = 6 \Omega$		10		ns
Rise Time	$t_r$			24		
Turn-Off Delay Time	$t_{d(off)}$			67		
Fall Time	$t_f$			37		
Input Capacitance	$C_{iss}$	$V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz$		2086		pF
Output Capacitance	$C_{oss}$			174		
Reverse Transfer Capacitance	$C_{rss}$			160		

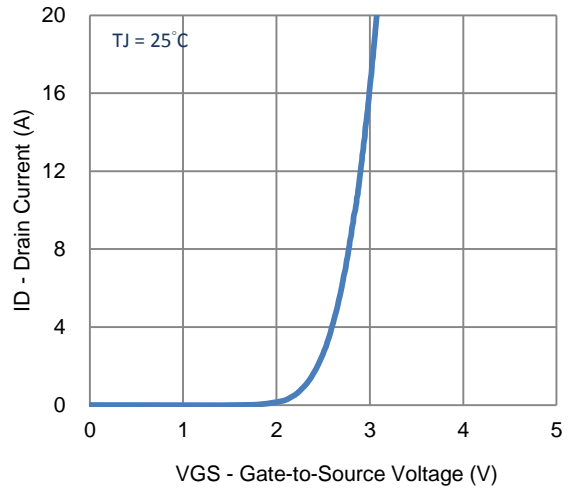
**Notes**

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

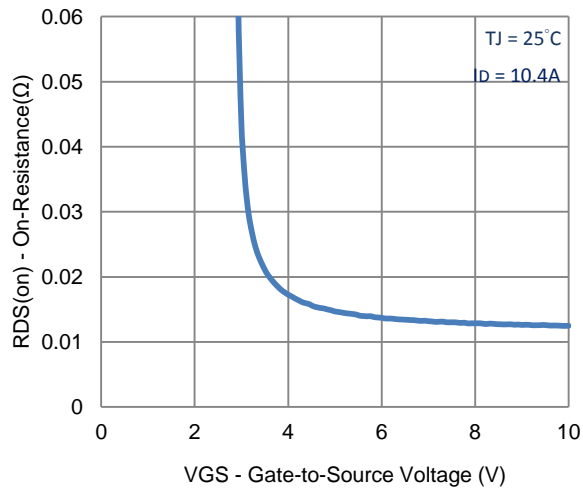
## Typical Electrical Characteristics



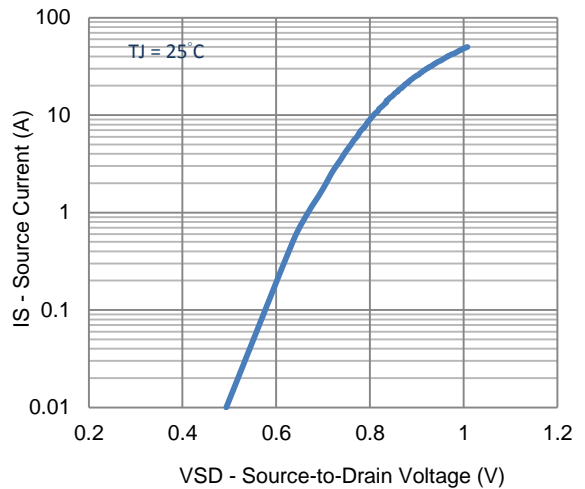
**1. On-Resistance vs. Drain Current**



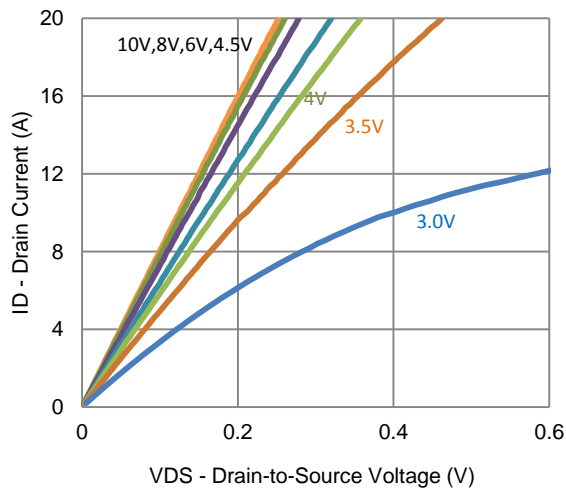
**2. Transfer Characteristics**



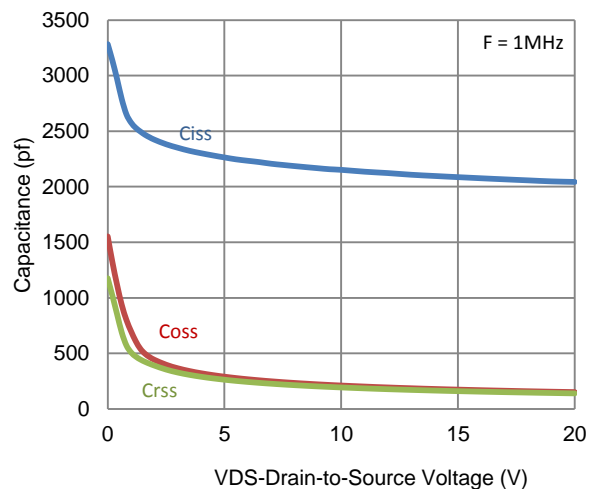
**3. On-Resistance vs. Gate-to-Source Voltage**



**4. Drain-to-Source Forward Voltage**

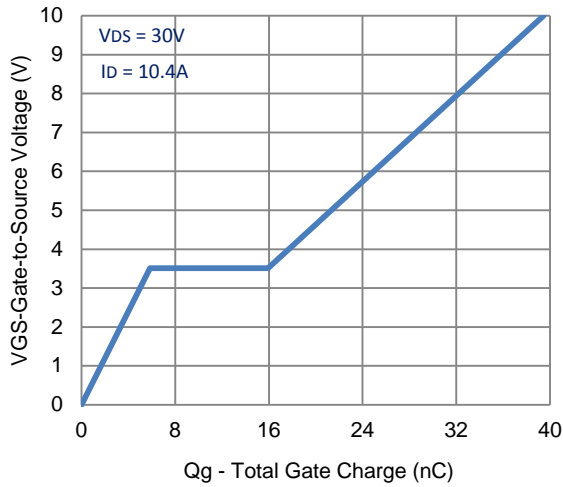


**5. Output Characteristics**

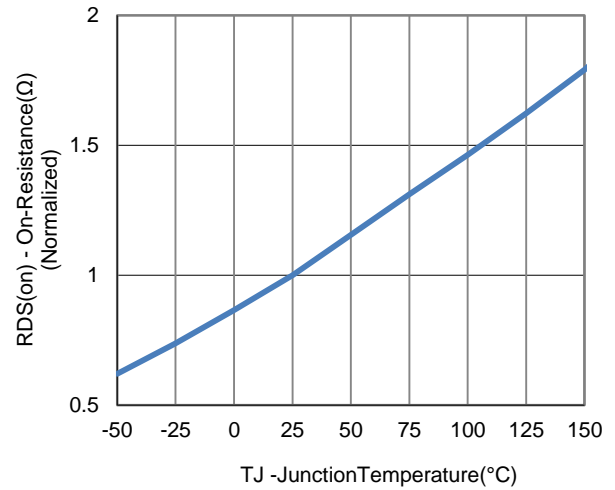


**6. Capacitance**

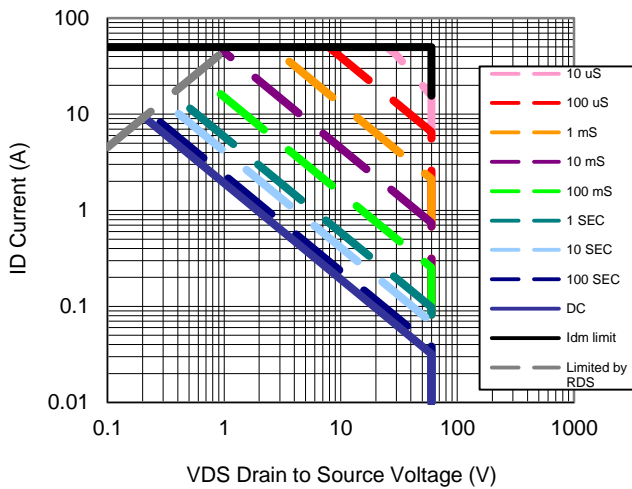
## Typical Electrical Characteristics



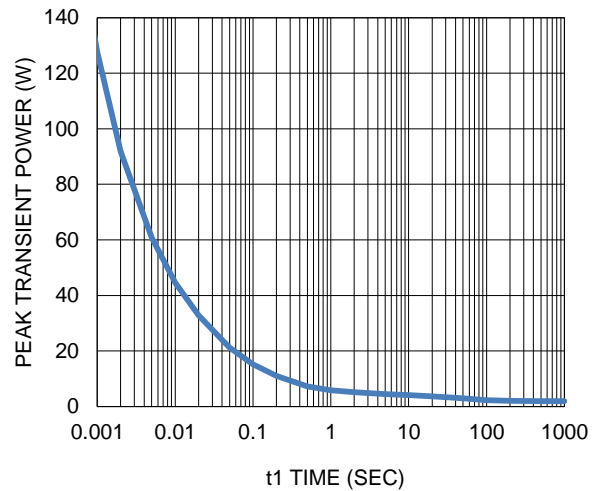
7. Gate Charge



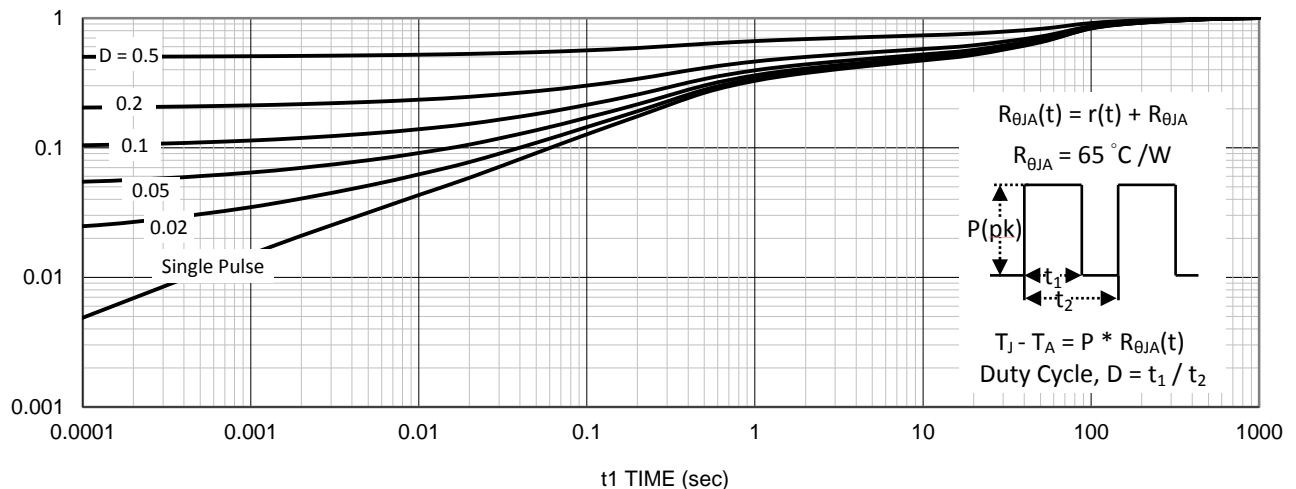
8. Normalized On-Resistance Vs Junction Temperature



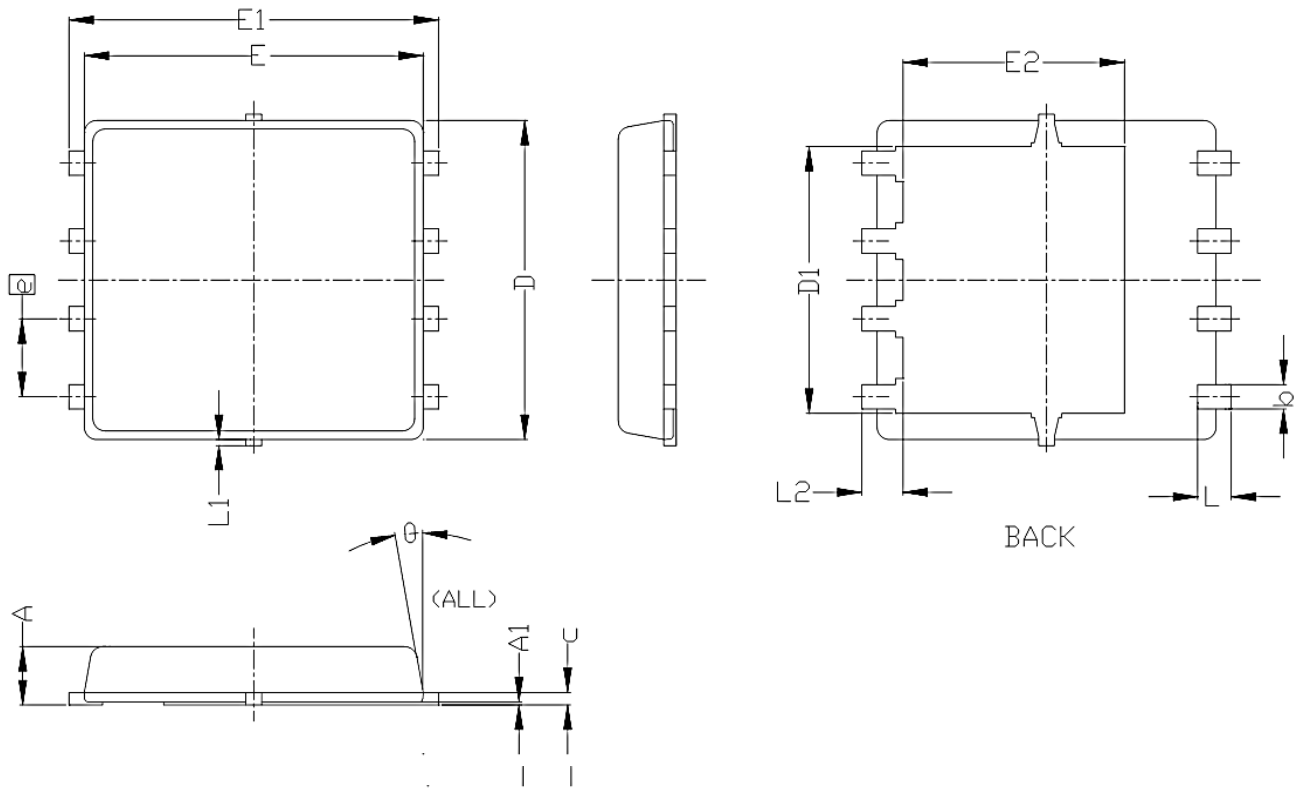
9. Safe Operating Area



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°
U	—	—	—	—	—	—