N-Channel 650-V (D-S) MOSFET

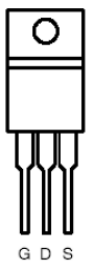
Key Features:
- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed

Typical Applications:
- Power Supplies
- Motor Drives
- Consumer Electronics

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (mΩ)	I_D (A)
650	650 @ V_{GS} = 10V	14[a]

Pb-free
RoHS COMPLIANT
HALOGEN FREE

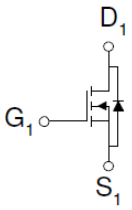
TO-220AB



DRAIN connected to TAB

G D S

Top View



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)				
Parameter		**Symbol**	**Limit**	**Units**
Drain-Source Voltage		V_{DS}	650	V
Gate-Source Voltage		V_{GS}	±30	
Continuous Drain Current [a]	T_C=25°C	I_D	14	A
Pulsed Drain Current [b]		I_{DM}	60	
Continuous Source Current (Diode Conduction) [a]	T_C=25°C	I_S	14	A
Power Dissipation [a]	T_C=25°C	P_D	300	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 175	°C

THERMAL RESISTANCE RATINGS			
Parameter	**Symbol**	**Maximum**	**Units**
Maximum Junction-to-Ambient [c]	$R_{\theta JA}$	62.5	°C/W
Maximum Junction-to-Case	$R_{\theta JC}$	0.5	

Notes
a. Package Limited
b. Pulse width limited by maximum junction temperature
c. Surface Mounted on 1” x 1” FR4 Board.

Electrical Characteristics

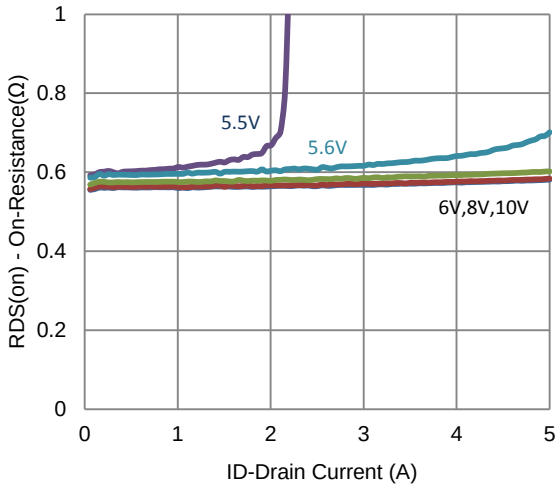
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 uA	2			V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±30 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 520 V, V_{GS} = 0 V			1	uA
		V_{DS} = 520 V, V_{GS} = 0 V, T_J = 55°C			10	
On-State Drain Current [a]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V	20			A
Drain-Source On-Resistance [a]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 2 A			650	mΩ
Forward Transconductance [a]	g_{fs}	V_{DS} = 15 V, I_D = 2 A		15		S
Diode Forward Voltage [a]	V_{SD}	I_S = 7 A, V_{GS} = 0 V		0.82		V
Dynamic [b]						
Total Gate Charge	Q_g	V_{DS} = 100 V, V_{GS} = 6 V, I_D = 2 A		29		nC
Gate-Source Charge	Q_{gs}			14		
Gate-Drain Charge	Q_{gd}			13		
Turn-On Delay Time	$t_{d(on)}$	V_{DS} = 100 V, R_L = 50 Ω, I_D = 2 A, V_{GEN} = 10 V, R_{GEN} = 6 Ω		30		ns
Rise Time	t_r			13		
Turn-Off Delay Time	$t_{d(off)}$			69		
Fall Time	t_f			12		
Input Capacitance	C_{iss}	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 Mhz		3469		pF
Output Capacitance	C_{oss}			203		
Reverse Transfer Capacitance	C_{rss}			3		

Notes

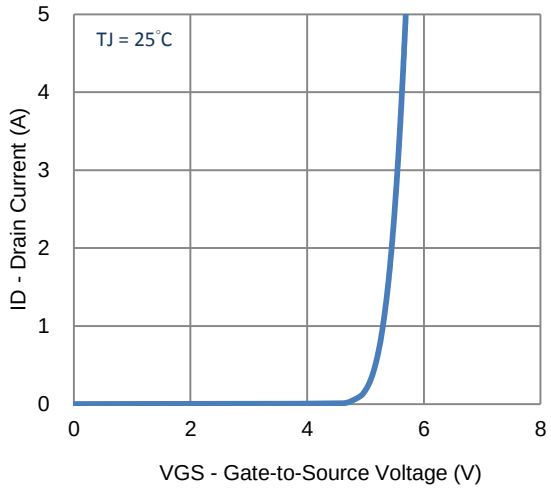
a. Pulse test: PW <= 300us duty cycle <= 2%.

b. Guaranteed by design, not subject to production testing.

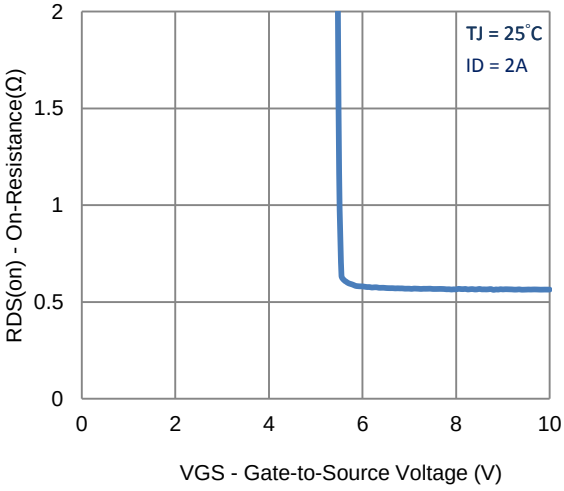
Typical Electrical Characteristics



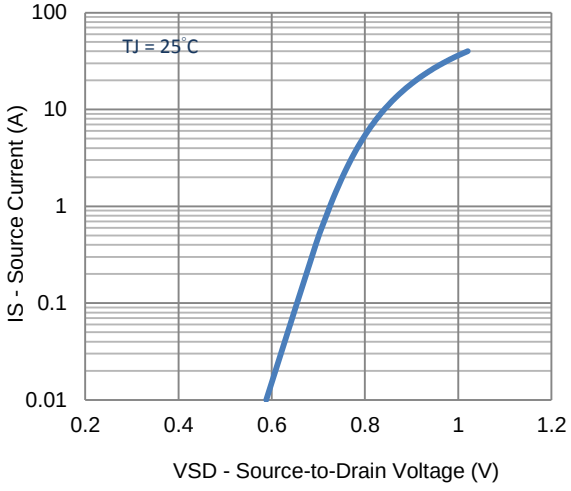
1. On-Resistance vs. Drain Current



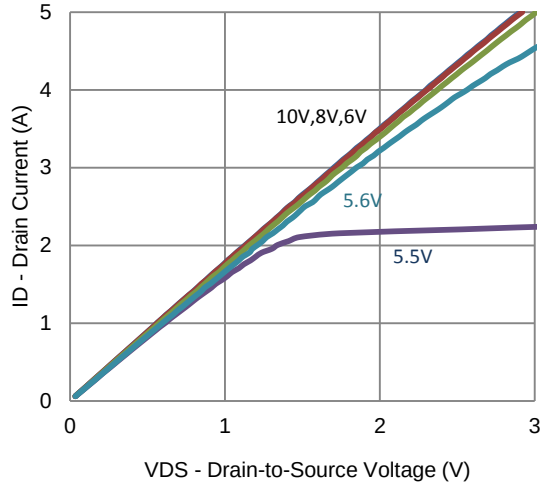
2. Transfer Characteristics



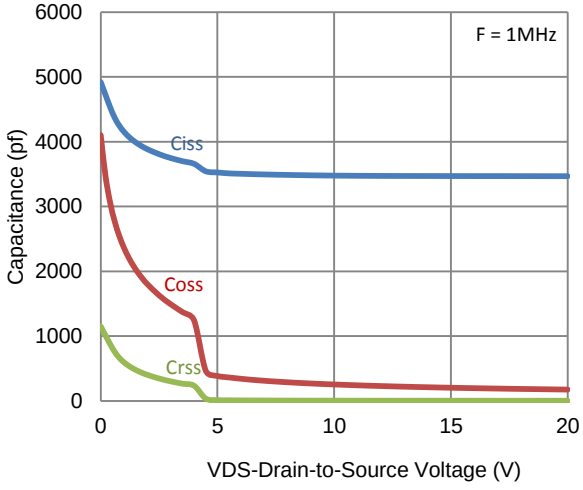
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

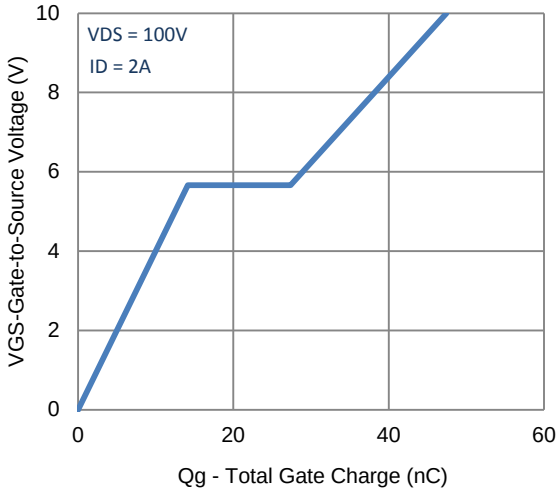


5. Output Characteristics

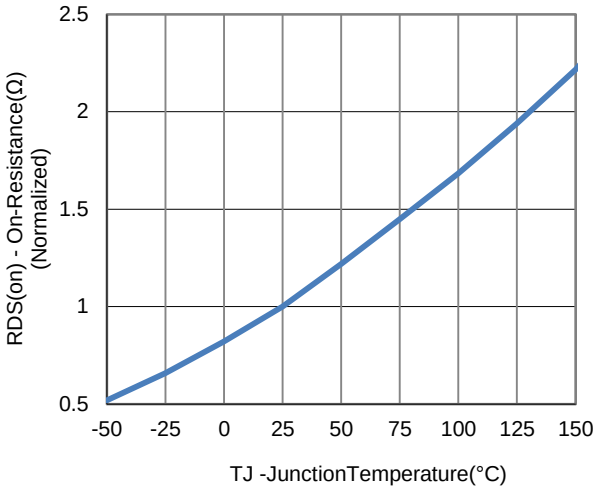


6. Capacitance

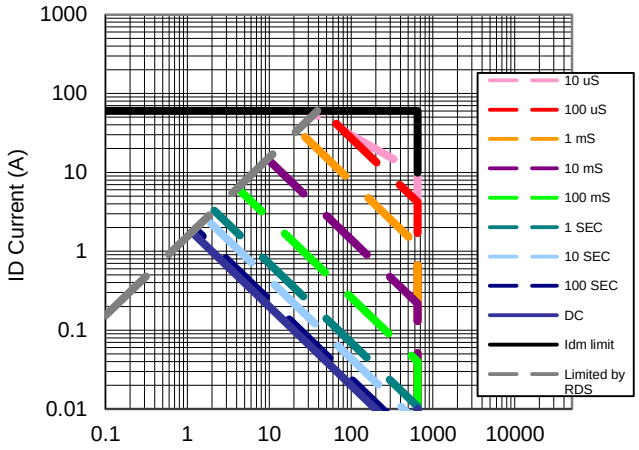
Typical Electrical Characteristics



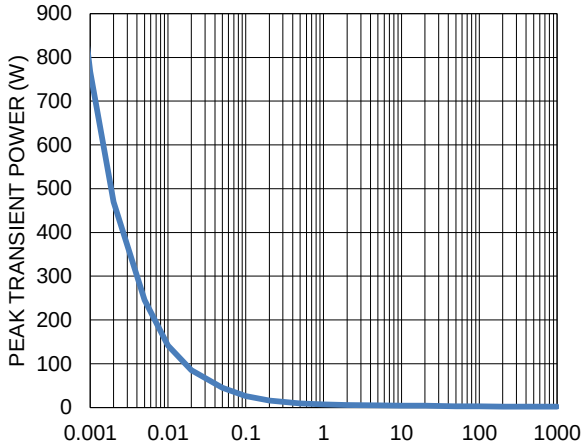
7. Gate Charge



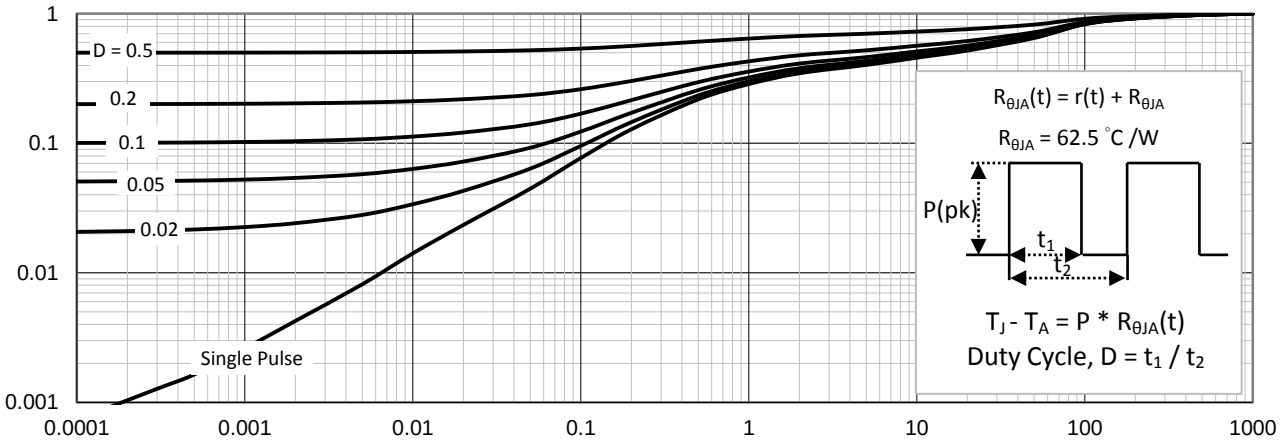
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

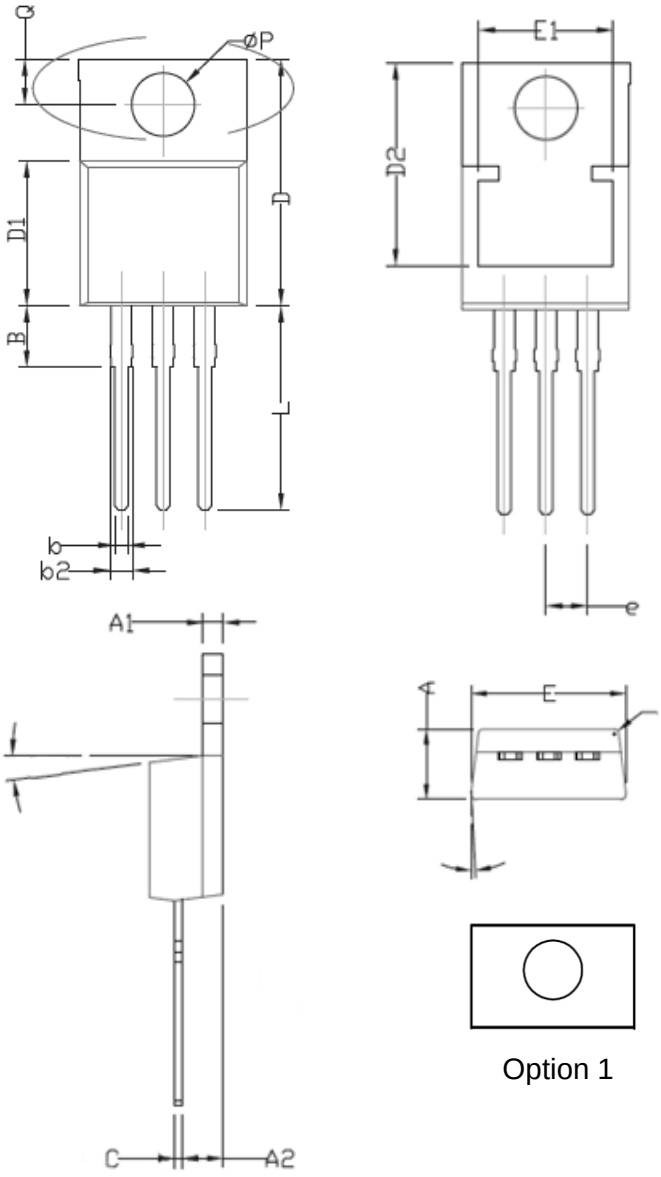


10. Single Pulse Maximum Power Dissipation

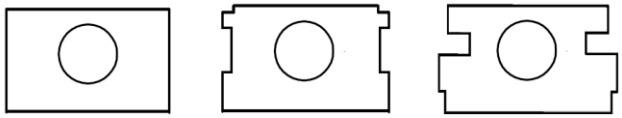


11. Normalized Thermal Transient Junction to Ambient

Package Information



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



Option 1 Option 2 Option 3