

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
650V	$0.6\Omega@10V$	12A

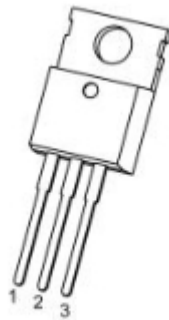
Feature

- Fast Switching
- Low Gate Charge and $R_{DS(on)}$
- 100% Single Pulse avalanche energy Test

Applications

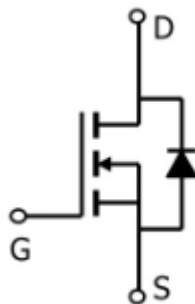
- DC-DC Converter
- Ideal for high-frequency switching and synchronous rectification

Package

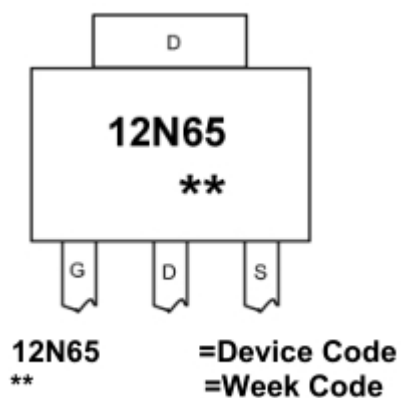


TO-220-3L-C(G:1 D:2 S:3)

Circuit diagram



Marking



Absolute maximum ratings

(T_a=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	650	V
Gate-Source Voltage	V _{GS}	±30	V
Continuous Drain Current ¹ (T _C = 25°C)	I _D	12	W
Pulsed Drain Current ²	I _{DM}	48	A
Single Pulse Avalanche Energy ³	E _{AS}	640	mJ
Total Power Dissipation (T _C = 25°C)	P _D	145	W
Thermal Resistance Junction- Case ¹	R _{θJC}	0.86	°C/ W
Storage Temperature Range	T _{STG}	-55~ +150	°C
Operating Junction Temperature Range	T _J	-55~ +150	°C

Electrical characteristics

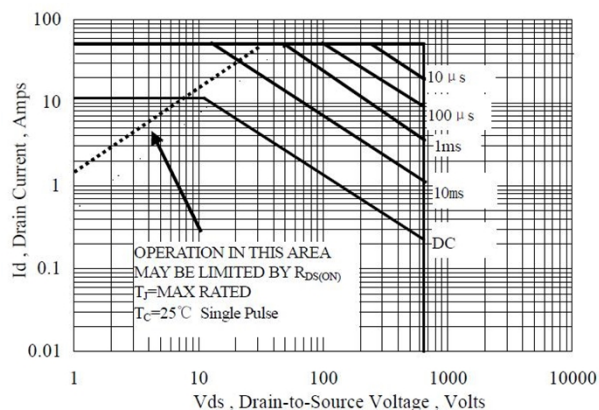
($T_A=25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	650			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = 520V, V_{GS} = 0V, T_J = 25^{\circ}C$			1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 100	μA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3	4	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 6A$		0.6	0.75	Ω
Dynamic characteristics ⁴						
Input Capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V, f = 1MHz$		1533		pF
Output Capacitance	C_{oss}			217		
Reverse Transfer Capacitance	C_{rss}			25		
Switching Characteristics						
Total Gate Charge(4.5V)	Q_g	$V_{DS} = 480V, V_{GS} = 10V, I_D = 6A$		44		nC
Gate-Source Charge	Q_{gs}			9		
Gate-Drain Charge	Q_{gd}			21		
Turn-On Delay Time	$T_{d(on)}$	$V_{DD} = 300V, V_{GS} = 6V, R_G = 25\Omega, I_D = 5.5A$		30		nS
Rise Time	T_r			115		
Turn-Off Delay Time	$T_{d(off)}$			95		
Fall Time	T_f			85		

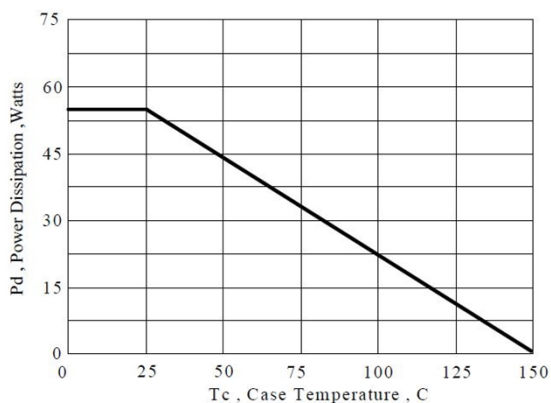
Note :

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. The EAS data shows Max. rating . The test condition is $R_G = 30\Omega, L = 60mH$

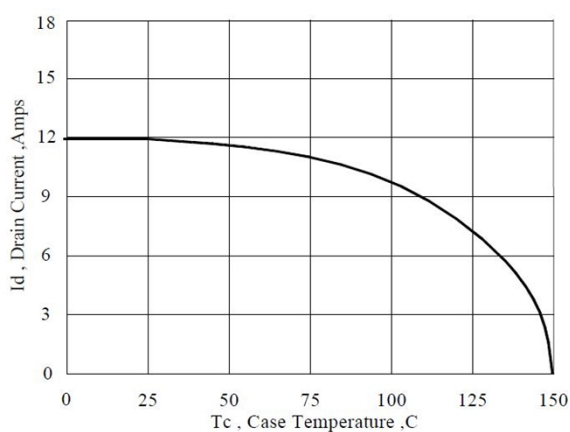
Typical Characteristics



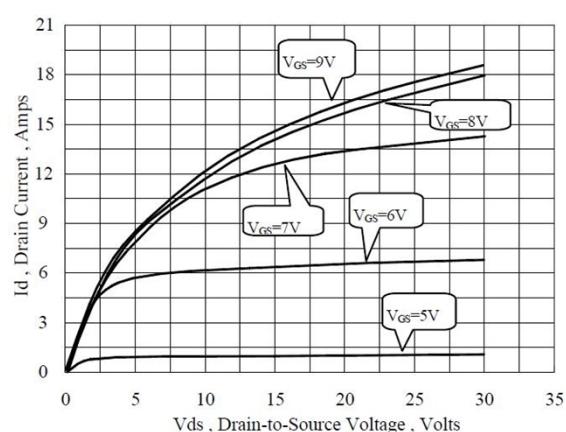
Maximum Forward Bias Safe Operating Area



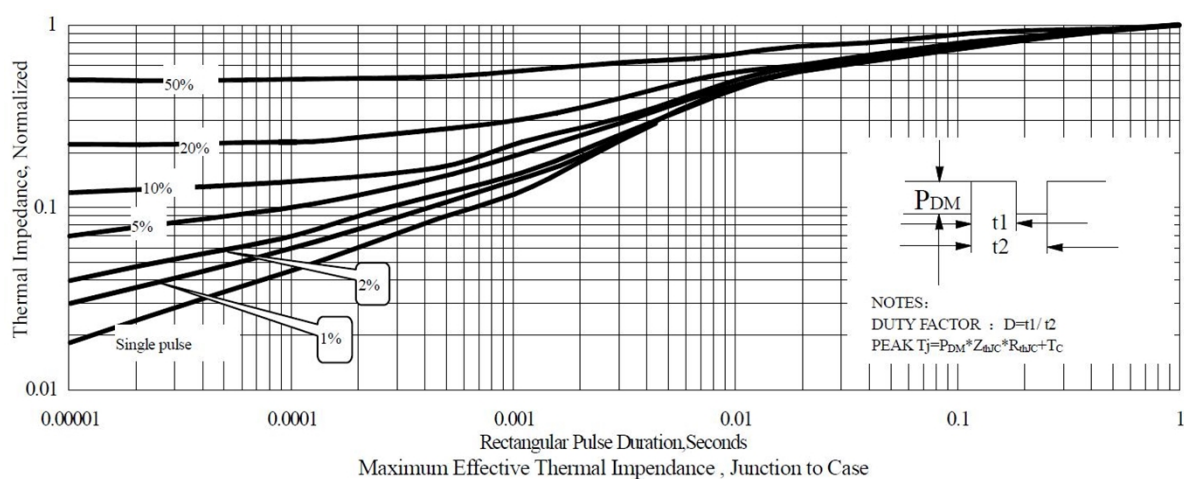
Maximum Power Dissipation vs Case Temperature



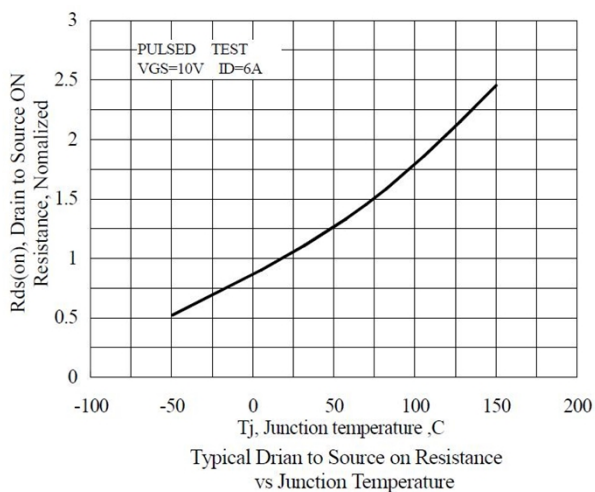
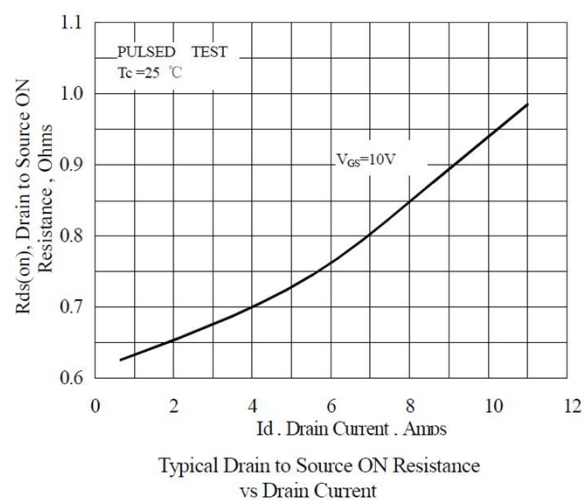
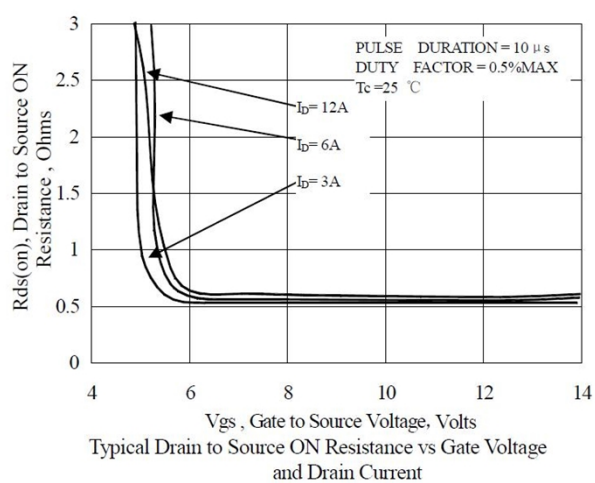
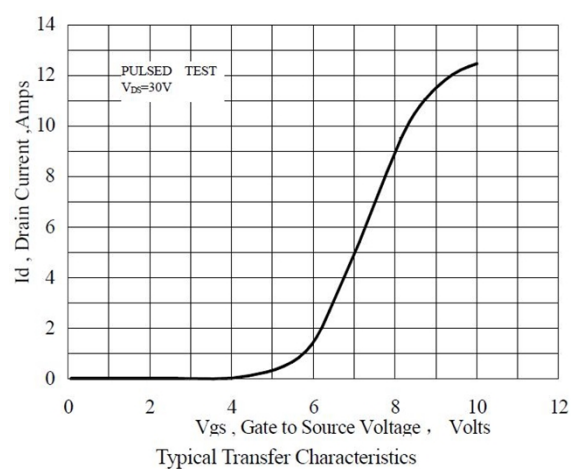
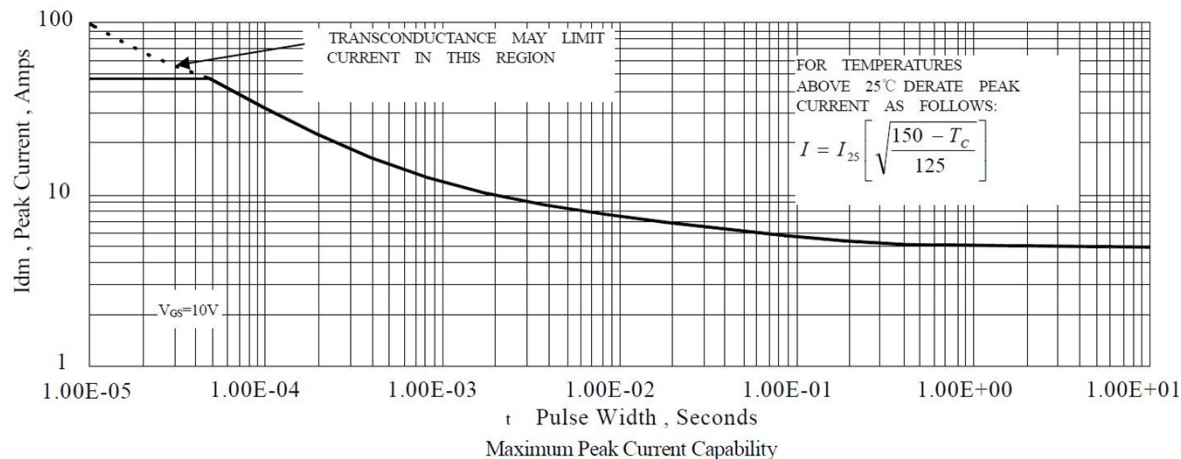
Maximum Continuous Drain Current vs Case Temperature

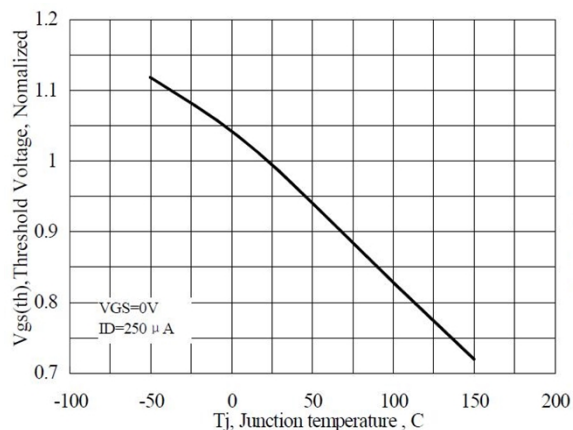


Typical Output Characteristics

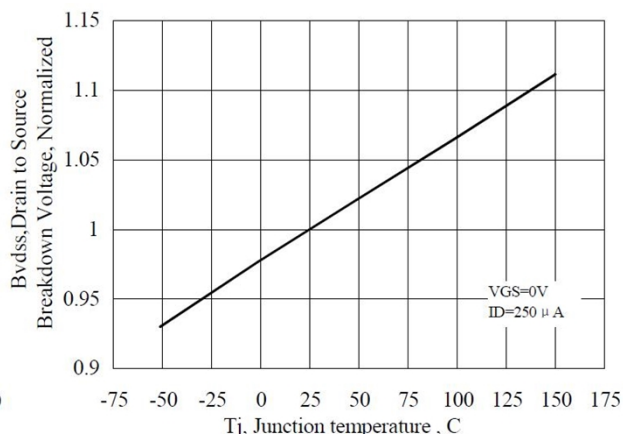


Maximum Effective Thermal Impedance, Junction to Case

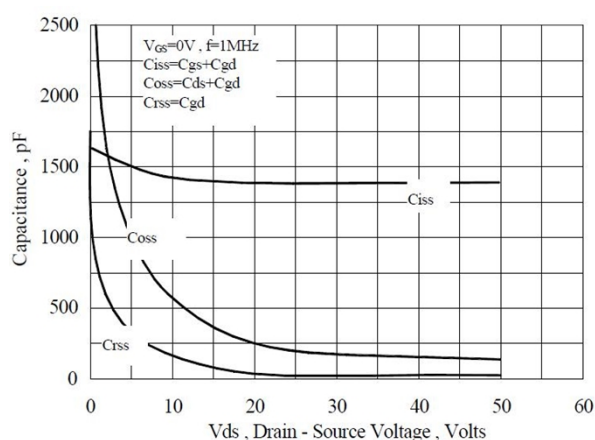




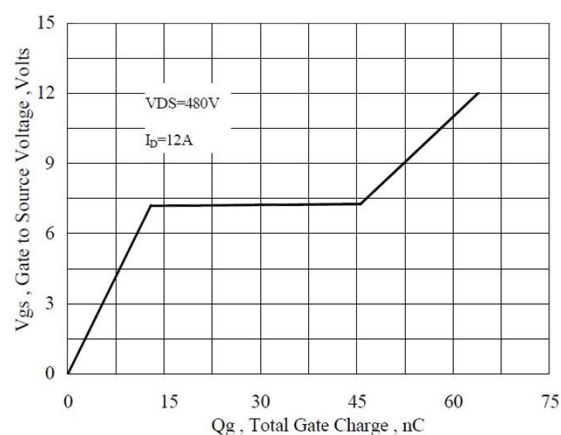
Typical Threshold Voltage vs Junction Temperature



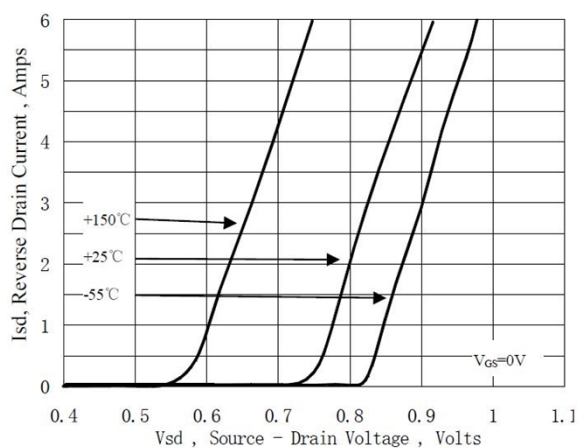
Typical Breakdown Voltage vs Junction Temperature



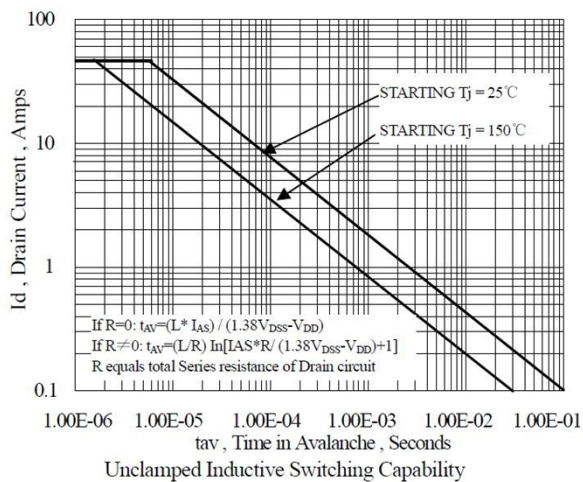
typical Capacitance vs Drain to Source Voltage



Typical Gate Charge vs Gate to Source Voltage

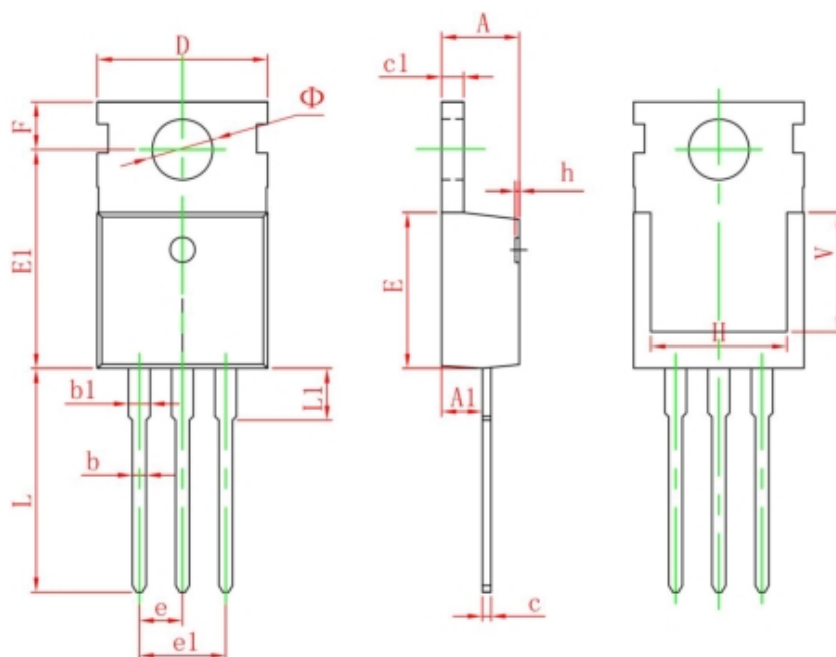


Typical Body Diode Transfer Characteristics



Unclamped Inductive Switching Capability

TO-220-3L-C Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.950	9.750	0.352	0.384
E1	12.650	13.050	0.498	0.514
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900 REF.		0.276 REF.	
Φ	3.400	3.800	0.134	0.150