

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	2.3mΩ@10V	165A
	3mΩ@4.5V	

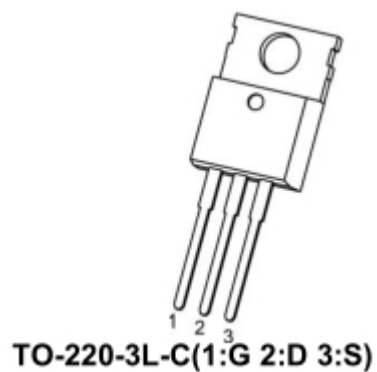
Feature

- $V_{DS} = 40V, I_D = 130A$
- High density cell design for ultra low R_{dson}
- Good stability and uniformity with high E_{AS}
- 100% Single Pulse avalanche energy Test

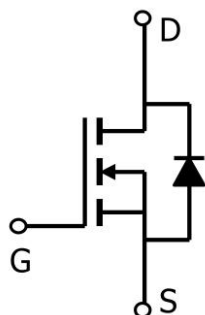
Application

- Power switching application
- Hard switched and high frequency circuits
- DC-DC Converters

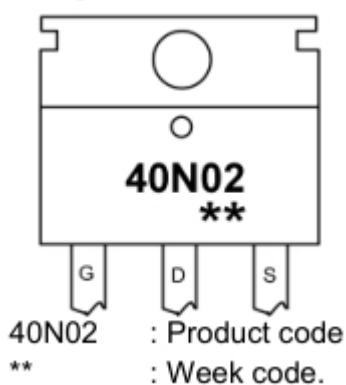
Package



Circuit diagram



Marking



Absolute maximum ratings

(T_a=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	40	V
Gate-Source Voltage	V _{GS}	±20	V
Drain Current-Continuous	I _D	165	A
Pulsed Drain Current	I _{DM}	660	A
Avalanche Current	I _{AS}	35	
Maximum Power Dissipation	P _D	130	W
Single pulse avalanche energy ⁽¹⁾	E _{AS}	306	mJ
Thermal Resistance,Junction-to-Case ⁽²⁾	R _{θJC}	0.96	°C/W
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-55 to 150	°C

Electrical characteristics

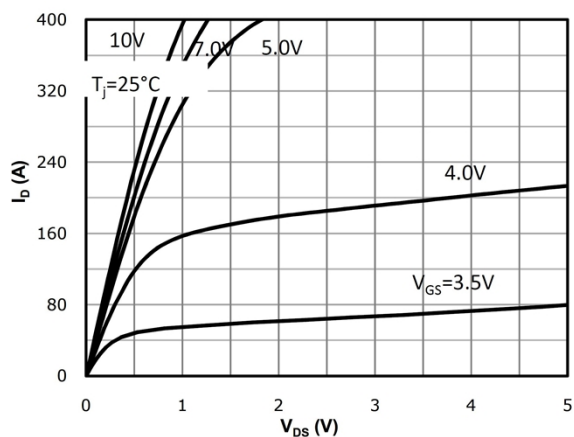
($T_A=25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	BV (BR)DSS	V _{GS} = 0V, I _D =250μA	40			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =32V,V _{GS} = 0V			1	uA
Gate-body leakage current	I _{GSS}	V _{GS} =±20V , V _{DS} =0V			±100	uA
Gate-source threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.0	1.5	2.5	V
Drain-source on-resistance ²	R _{DS(on)}	V _{GS} =10V, I _D =30A		2.3	2.9	mΩ
		V _{GS} =4.5V, I _D =20A		3	4	
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V, f=1MHz		5728		pF
Output Capacitance	C _{OSS}			690		
Reverse Transfer Capacitance	C _{rss}			328		
Total Gate Charge	Q _g	V _{DS} =20V, V _{GS} =10V, I _D =50A		125		pF
Gate-Source Charge	Q _{gs}			23		
Gate-Drain Charge	Q _{gd}			37		
Switching Characteristics						
Turn-On Delay Time	T _{d(on)}	V _{DD} =20V, I _D =50A, R _L =1Ω, V _{GS} =10V, R _G =3Ω		15		nS
Rise Time	T _r			42		
Turn-Off Delay Time	T _{d(off)}			35		
Fall Time	T _f			13		
Diode Characteristics						
Diode Forward Voltage ²	V _{SD}	V _{GS} =0V, I _S =1A			1.2	V

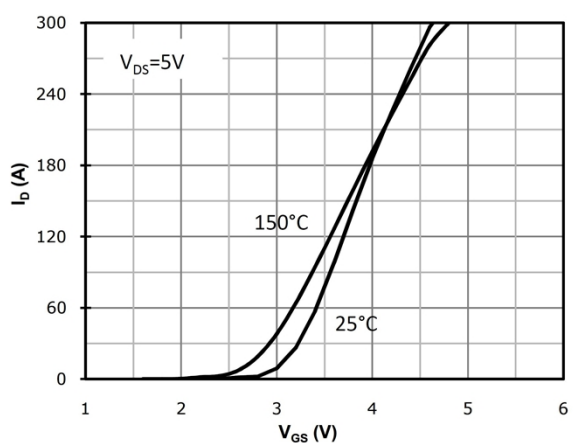
Note:

1. E_{AS} condition : $T_J = 25^{\circ}\text{C}, V_{DD} = 20V, V_G = 10V, L = 0.5mH, R_g = 25\Omega$
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

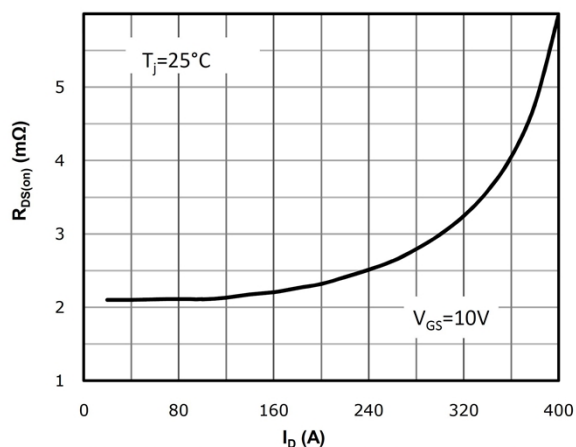
Typical Characteristics



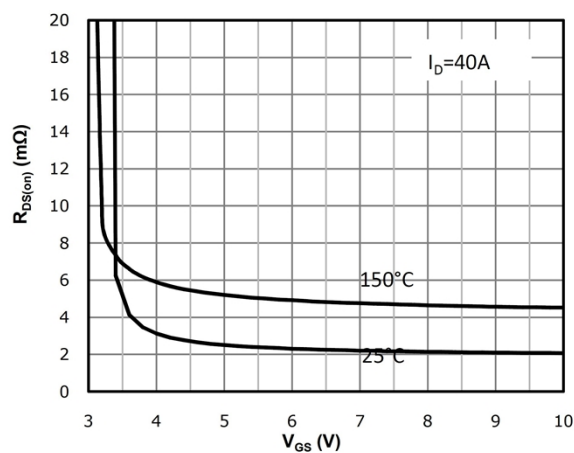
Output Characteristics



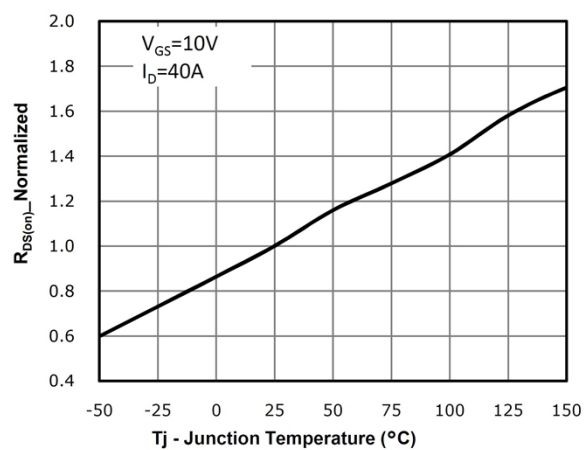
Transfer Characteristics



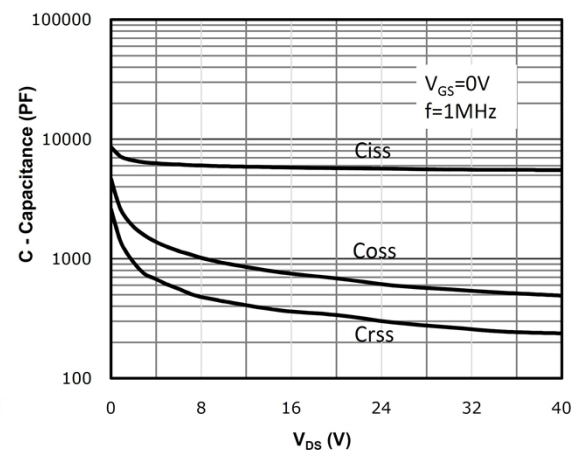
Rds(on) vs Drain Current and Gate Voltage



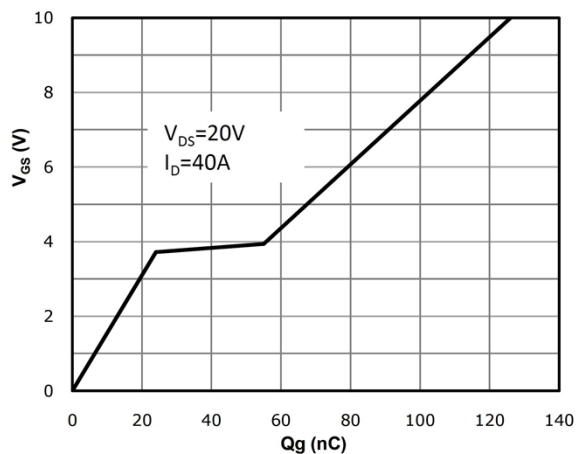
Rds(on) vs Gate Voltage



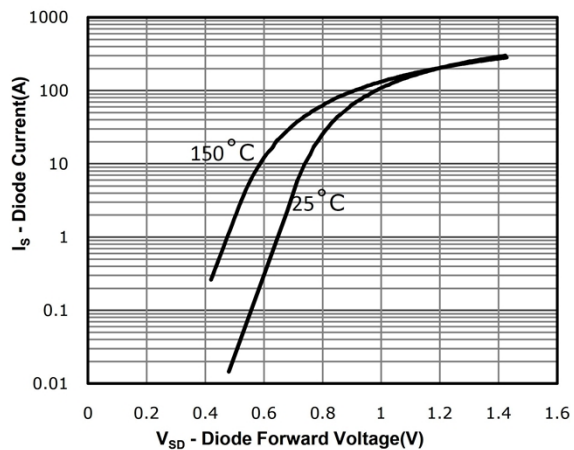
Rds(on) vs. Temperature



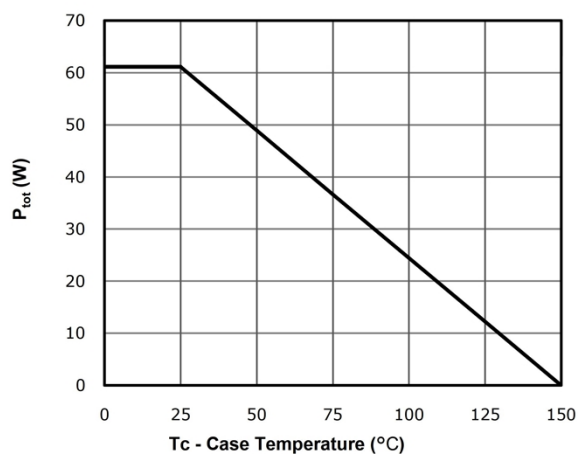
Capacitance Characteristics



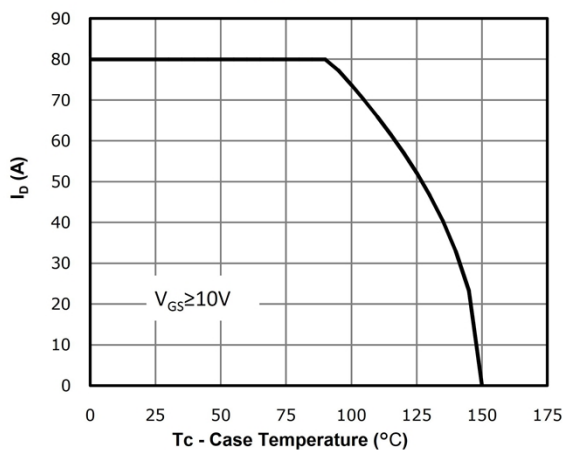
Gate Charge Characteristics



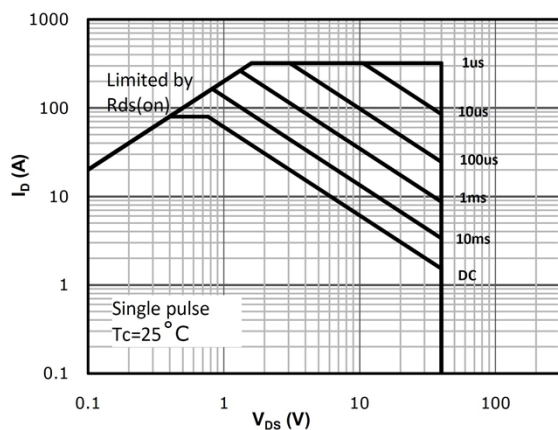
Body-diode Forward Characteristics



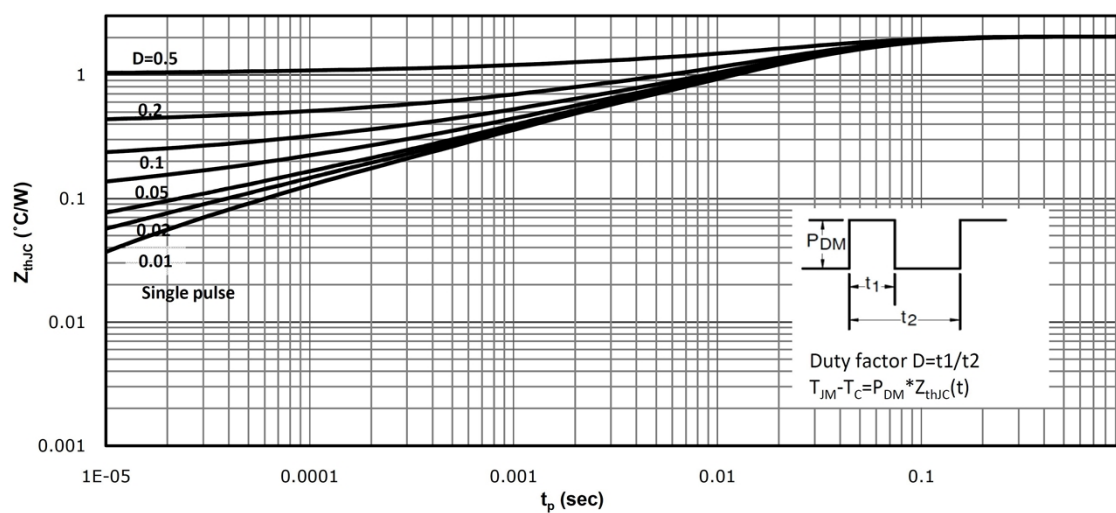
Power Dissipation



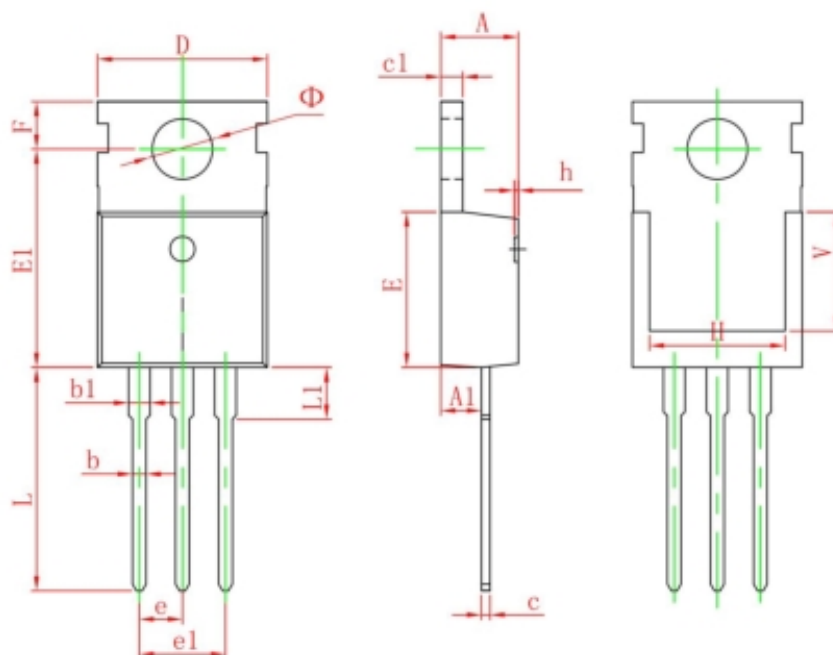
Drain Current Derating



Safe Operating Area



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