

Features

- Split Gate Trench MOSFET Technology
- High Density Cell Design for Low $R_{DS(ON)}$
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (Note1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant (Note2) ("P" Suffix Designates RoHS Compliant. See Ordering Information)

Maximum Ratings

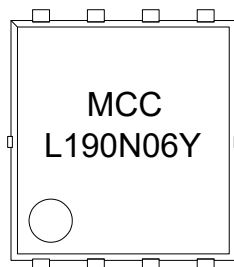
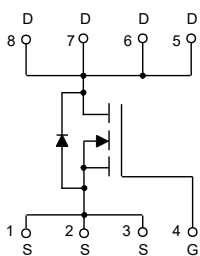
- Operating Junction Temperature Range : -55°C to +175°C
- Storage Temperature Range: -55°C to +175°C
- Thermal Resistance: 50°C/W Junction to Ambient (Note3)
- Thermal Resistance: 0.78°C/W Junction to Case

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	$T_C=25^\circ\text{C}$	190
		$T_C=100^\circ\text{C}$	134
Pulsed Drain Current (Note4)	I_{DM}	760	A
Total Power Dissipation (Note5)	P_D	192	W
Single Pulse Avalanche Energy (Note6)	E_{AS}	512	mJ

Note:

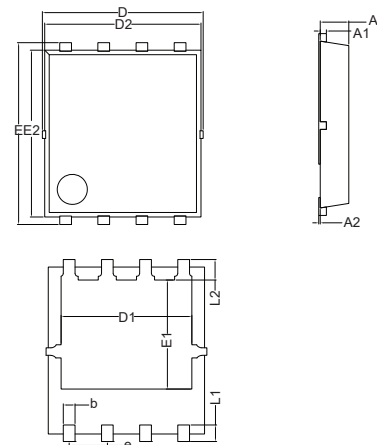
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. High Temperature Solder Exemption Applied, see EU Directive Annex 7(a)-I.
3. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$.
4. Repetitive rating; pulse width limited by max. junction temperature.
5. P_D is based on max. junction temperature, using junction-case thermal resistance.
6. $T_J=25^\circ\text{C}$, $V_{DD}=30\text{V}$, $V_{GS}=10\text{V}$, $R_G=25\Omega$, $L=1\text{mH}$.

Internal Structure and Marking Code



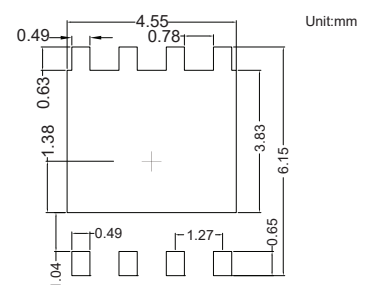
N-CHANNEL MOSFET

DFN5060-C



DIM	DIMENSIONS				NOTE
	INCHES		MM		
D	0.203	0.218	5.15	5.55	
D2	0.201	0.209	5.10	5.30	
E	0.234	0.242	5.95	6.15	
E2	0.215	0.222	5.45	5.65	
A	0.033	0.041	0.85	1.05	
A1	0.008		0.203		BSC
A2	0.000	0.004	0.00	0.10	
D1	0.167	0.175	4.25	4.45	
E1	0.139	0.147	3.52	3.73	
L1	0.018	0.026	0.45	0.65	
L2	0.027		0.68		BSC
b	0.012	0.020	0.30	0.50	
e	0.050		1.27		BSC

Suggested Solder Pad Layout



Electrical Characteristics @ 25°C (Unless Otherwise Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=1mA$	60			V
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=48V, V_{GS}=0V$			1	μA
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	2.5	3.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=50A$		1.6	2.0	m Ω
		$V_{GS}=6V, I_D=20A$		2.5	3.5	
Gate Resistance	R_g	f=1 MHz, Open Drain		2.9		Ω
Diode Characteristics						
Continuous Body Diode Current	I_S				190	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=50A$			1.2	V
Reverse Recovery Time	t_{rr}	$I_F=95A, dI_F/dt=100A/\mu s$		52.9		ns
Reverse Recovery Charge	Q_{rr}			56.8		nC
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=30V, V_{GS}=0V, f=1MHz$		3569		pF
Output Capacitance	C_{oss}			1202		
Reverse Transfer Capacitance	C_{riss}			63.5		
Total Gate Charge	Q_g	$V_{DS}=30V, V_{GS}=10V, I_D=95A$		54.6		nC
Gate-Source Charge	Q_{gs}			12.8		
Gate-Drain Charge	Q_{gd}			17.6		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=30V, V_{GS}=10V, I_{DS}=95A, R_G=6\Omega$		17.3		ns
Turn-On Rise Time	t_r			32		
Turn-Off Delay Time	$t_{d(off)}$			43.7		
Turn-Off Fall Time	t_f			34.5		

Curve Characteristics

Fig. 1 - Typical Output Characteristics

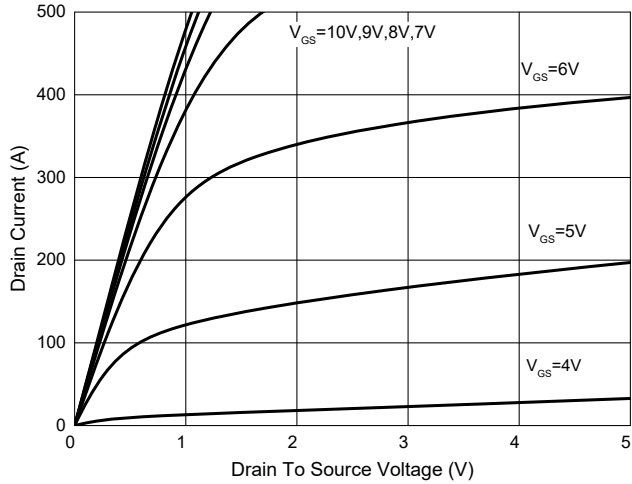


Fig. 2 - Transfer Characteristics

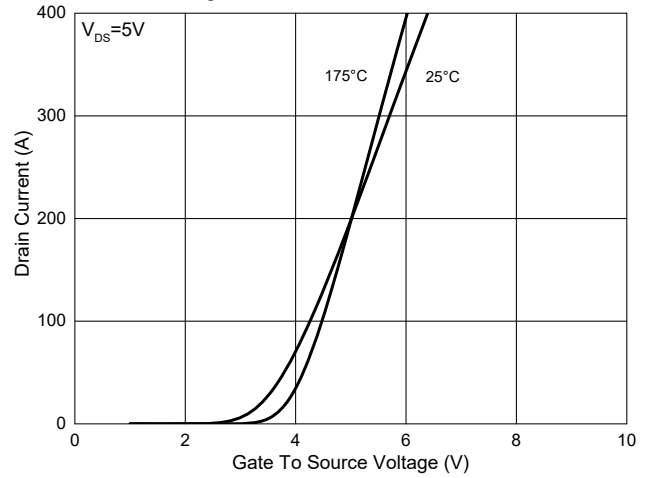


Fig.3 - $R_{DS(ON)}$ - V_{GS}

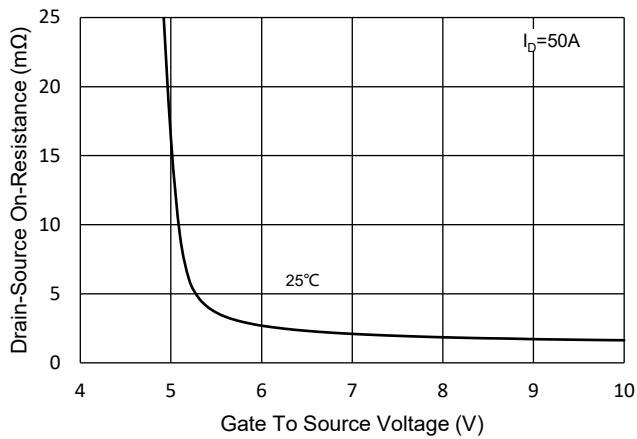


Fig.4 - $R_{DS(ON)}$ - I_D

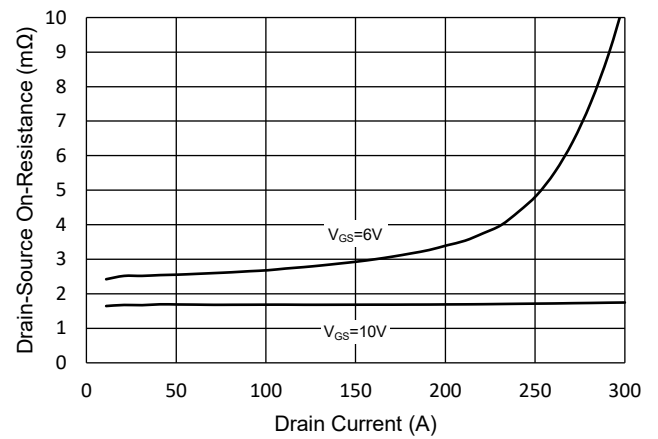


Fig.5 - Capacitance Characteristics

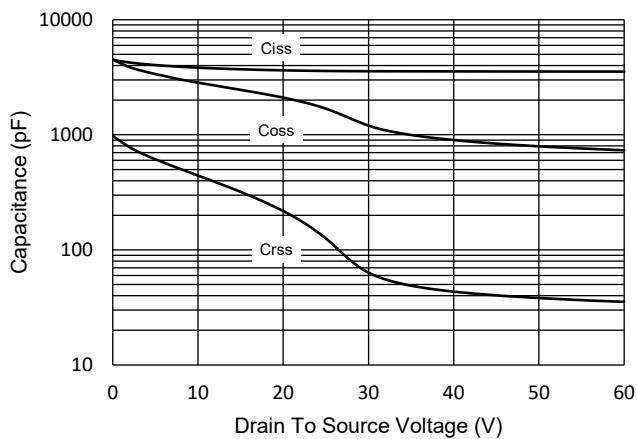
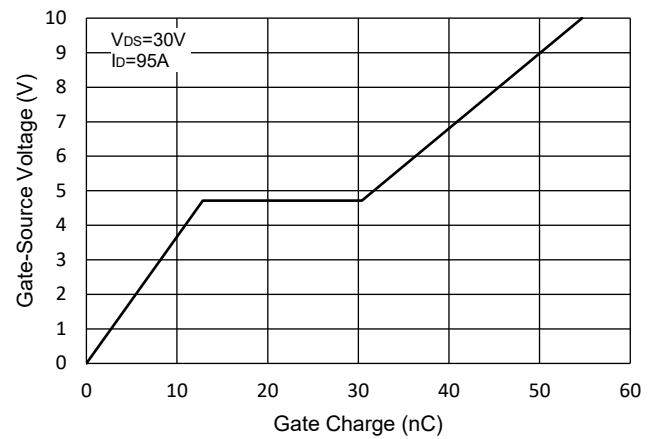


Fig.6 - Gate Charge



Curve Characteristics

Fig.7 - Normalized Threshold Voltage

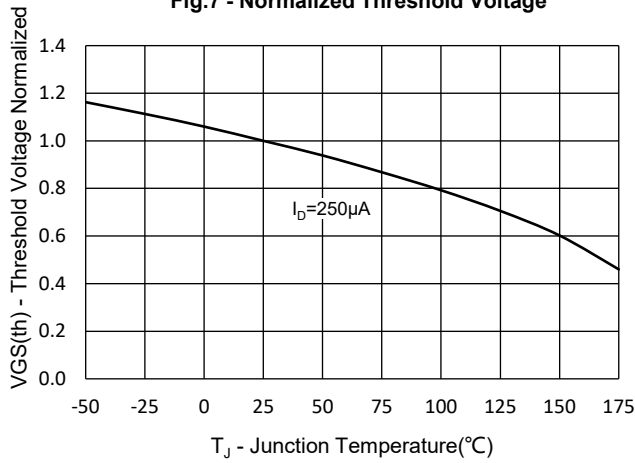


Fig.8 - Normalized On Resistance Characteristics

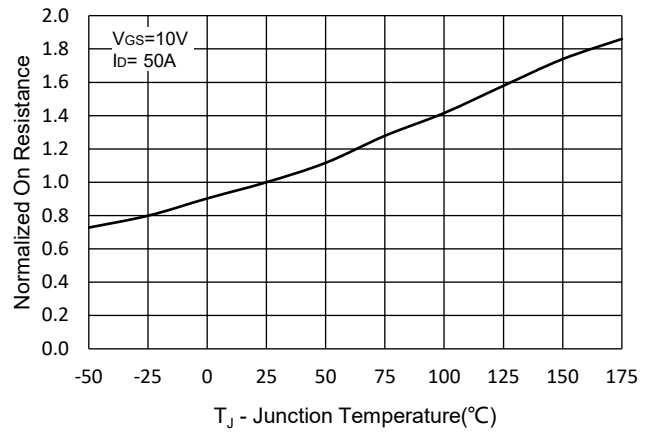


Fig.9 - I_S - V_{SD}

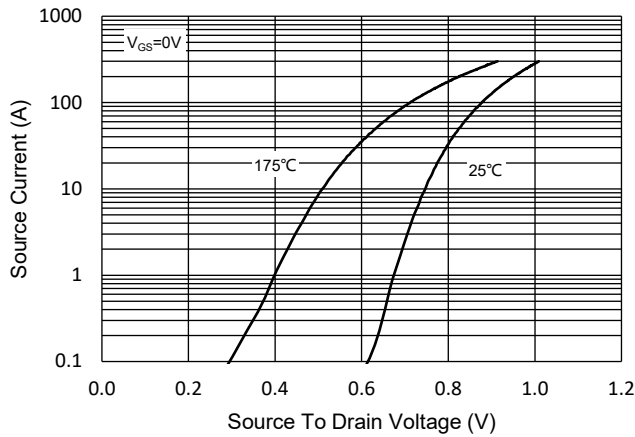


Fig.10 - Drain Current

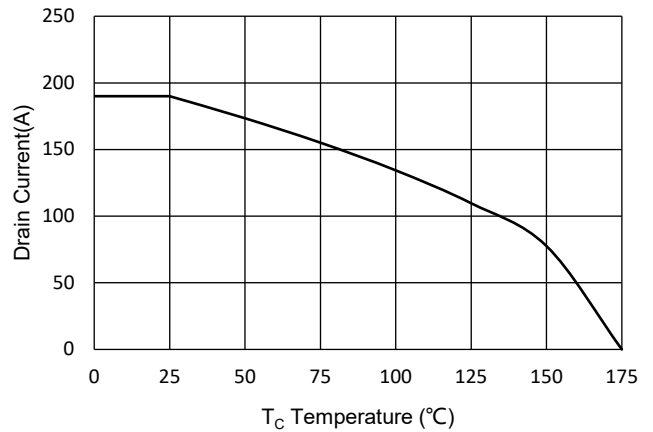
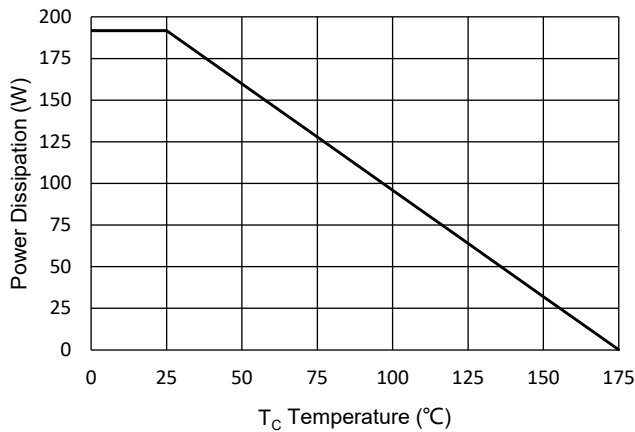


Fig.11 - PD Dissipation



Curve Characteristics

Fig. 12 - Safe Operation Area

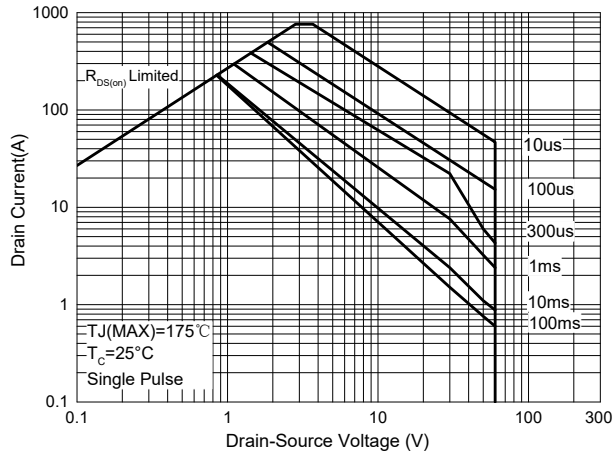
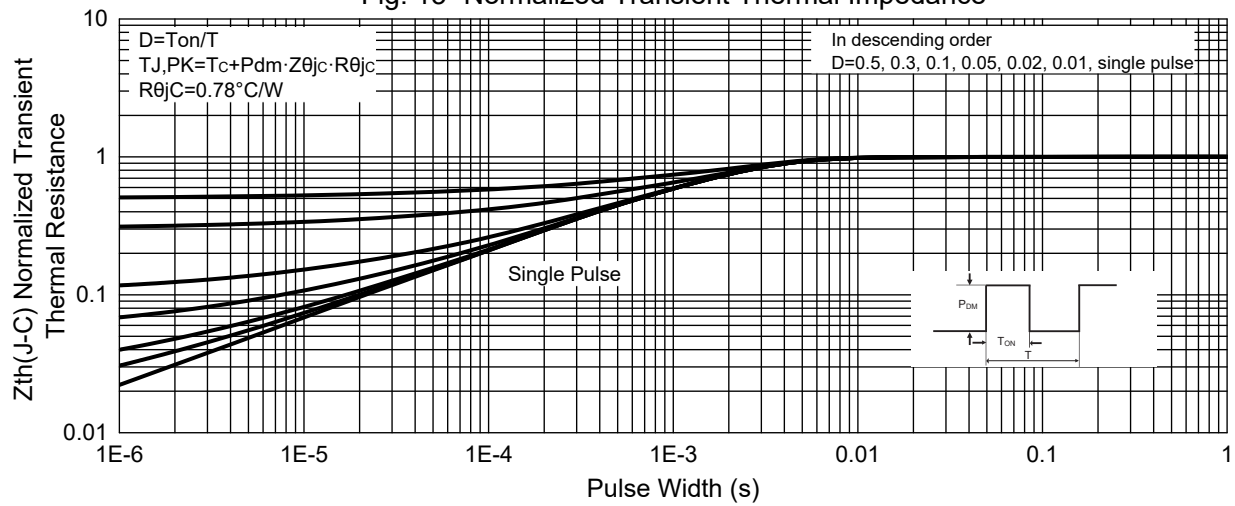


Fig. 13 - Normalized Transient Thermal Impedance



Ordering Information

Device	Packing
Part Number-TP	Tape&Reel: 5Kpcs/Reel

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